CCD-TRV10E/TRV12/TRV12E/TRV12PK
TRV22/TRV112/TRV212
RMT-713

SERVICE MANUAL

US Model
CCD-TRV12/TRV22/TRV112/TRV212

Canadian Model
CCD-TRV12/TRV22

AEP Model

UK Model
CCD-TRV10E

E Model
CCD-TRV12/TRV12PK

Hong Kong Model
CCD-TRV12

Russian Model
CCD-TRV10E/TRV12E

Tourist Model
CCD-TRV12

Photo: CCD-TRV12

Video8 Handycam

B MECHANISM

Differences Manual

For MECHANISM ADJUSTMENT, refer to the "8 mm Video MECHANICAL ADJUSTMENT MANUAL VII" (9-973-801-11).

- The electrical and mechanical specifications for the models CCD-TRV10E/TRV12/TRV12E/TRV12PK/TRV22/TRV112/TRV212 are the same as those for models CCD-TRV11E/TRV21/TRV21E except for the following points.

New Model	Original Model	Changed Points		
		Digital Zoom	Steady Shot	Cabinet Color
CCD-TRV10E	CCD-TRV11E	—	—	Gray
CCD-TRV12 /TRV12PK/TRV112	CCD-TRV21	US, Canadian: X26 E, Hong Kong, Tourist: X52	Deleted	Gray
CCD-TRV12E	CCD-TRV21E	X26	Deleted	Gray
CCD-TRV22/TRV212	CCD-TRV21	X26	Not Changed	Gray

- Therefore, this manual contains only the points which differ from the models CCD-TRV11E/TRV21/TRV21E.
- For the informations not contained in this manual, please refer to the CCD-TRV11/TRV11E/TRV21/TRV21E/TRV21PK service manuals (9-973-913-□□).

8 VIDEO CAMERA RECORDER

MICROFILM

SONY

• 2.5 inch LCD information

There are 2 kinds of TYPE A and TYPE B. Identify either TYPE A or B from the suffix of the board. However, PC board without parts (no mount) is not supplied.

BOARD	TYPE A	TYPE B
PD-67	1-660-424-13	1-660-424-22
SD-21	1-660-425-12	1-660-425-22

• Printed wiring boards, schematic diagrams and repair parts list information

The CAMERA1, VIDEO2, AUDIO, POWER, EVF blocks and repair parts list are partially listed in the schematic diagrams. Also, the printed wiring diagram shows the CF-42 board only.
For the schematic diagrams and repair parts list not listed and other printed wiring boards, see the CCD-TRV11/TRV11E/TRV21/TRV21E/TRV21PK of the original Service Manual.

Schematic diagrams concerned

BLOCK	CAMERA1		VIDEO2		AUDIO		POWER		EVF	CAMERA2/3, VIDEO1, MODE/ SYSTEM CONTROL, STEADY SHOT, LCD, RGB DECODER
	CD-147	VC-167 (1/8)	JK-146	VC-167 (5/8)	MA-266	VC-167 (7/8)	DD-80	VC-167 (8/8)	VF-102	
THIS SERVICE MANUAL	○	—	○	—	Partial listing	Partial listing	Partial listing	—	Partial listting	—
ORIGINAL SERVICE MANUAL	—	○	—	○	○	○	○	○	○	○

- Notes for the page indication of destination in the block diagrams, schematic diagrams and marks.
  (SEE PAGE □□): Pages on the original service manual.
  <SEE PAGE □□>: Pages on this service manual.
  : Points added parts.
  : Points deleted parts.
  : Points changed parts.

• Adjustment information

1. The adjustment here covers a part of LCD system adjustment and CAMERA section adjustment (see Note 1). For other adjsutments, see the CCD-TRV11/TRV11E/TRV21/TRV21E/TRV21PK of the original Service Manual.
   However, the model names used in the description are different, and therefore refer to the model name correlative table below.

ORIGNAL SERVICE MANUAL	THIS SERVICE MANUAL	Remark (function)
CCD-TRV21/TRV21E	EXCEPT CCD-TRV10E	Digital zoom, Steady shot, Wide mode
CCD-TRV11E/TRV21E	CCD-TRV10E/TRV12E	PAL Mode
CCD-TRV11/TRV21	CCD-TRV12/TRV12PK/TRV22/TRV112/TRV212	NTSC Model

Note 1:
- Precautions
- Page F data modification
- Flange back adjustment
- Camera-shaking correction adjustment (CCD-TRV22/TRV212 model)
- FOR CAMERA COLOR REPRODUCTION ADJUSTMENT

2. NTSC model: CCD-TRV12/TRV12PK/TRV22/TRV112/TRV212
   PAL model: CCD-TRV10E/TRV12E

Table for difference of specification

Model	CCD-TRV12/TRV12PK/TRV112	CCD-TRV10E	CCD-TRV22/TRV212	CCD-TRV12E
Video signal	NTSC color, EIA standards	PAL color, CCIR standards	NTSC color, EIA standards	PAL color, CCIR standards
Recording/playback time	SP mode: 2 hours (P6-120) LP mode: 4 hours (P6-120)	SP mode: 1 hours and 30 minutes (P5-90) LP mode: 3 hours (P5-90)	SP mode: 2 hours (P6-120) LP mode: 4 hours (P6-120)	SP mode: 1 hours and 30 minutes (P5-90) LP mode: 3 hours (P5-90)
Fastforward/ rewind time	Approx. 5 min. (P6-120)	Approx. 5 min. (P5-90)	Approx. 5 min. (P6-120)	Approx. 5 min. (P5-90)
Focal distance	7/32 -2 5/8 inches(5.3-68.9 mm) When converted to a 35 mm still camera 1 9/16-18 1/2 inches (38-494 mm)		7/32-2 5/8 inches (5.3-68.9 mm) When converted to a 35 mm still camera 1 7/8-22 1/4 inches (46-598 mm)	
Minimum illumination	0.6 lux at F1.8	0.5 lux at F1.8	2 lux at F1.8	0.5 lux at F1.8
Illumination range	0.6 to 100,000 lux	0.5 to 100,000 lux	2 to 100,000 lux	0.5 to 100,000 lux
Average power consumption	4.8 W during camera recording using the LCD3.7 W during camera recording using the viewfinder	4.7 W during camera recording using the LCD 3.6 W during camera recording using the viewfinder	4.9 W during camera recording using the LCD 3.8 W during camera recording using the viewfinder	4.8 W during camera recording using the LCD 3.7 W during camera recording using the viewfinder
Mass (Approx.)	Excluding the battery pack, lithium battery, cassetted and Shoulder strap 860 g Including the bettery pack, NP-33, lithium battery CR2025, cassette P6-120 and shoulder strap 1.1 kg	Excluding the battery pack, lithium battery, cassetted and Shoulder strap 850 g Including the bettery pack, NP-33, lithium battery CR2025, cassette P5-90 and shoulder strap 1.1 kg	Excluding the battery pack, lithium battery, cassetted and Shoulder strap 870 g Including the bettery pack, NP-33, lithium battery CR2025, cassette P6-120 and shoulder strap 1.1 kg	Excluding the battery pack, lithium battery, cassetted and Shoulder strap 860 g Including the bettery pack, NP-33, lithium battery CR2025, cassette P5-90 and shoulder strap 1.1 kg

Table for difference of functions

Model	TRV10E (PAL)	TRV12 (US, CND)/ TRV112 (NTSC)	TRV12 (E, HK, JE)/ TRV12PK (NTSC)	TRV12E (PAL)	TRV22/TRV212 (NTSC)
Digital zoom	×	O (x26)	O (x52)	O (x26)	O (x26)
Steady shot	×	×	×	×	O
Wide mode	×	×	O	O	×

abbreviation
CND: Canadian model HK: Hong kong model JE: Tourist model

* CCD-TRV12PK is model that carring bag are added in CCD-TRV12 (E model). CCD-TRV12PK is different from CCD-TRV12 (E model) only in the accessory and packing materials.
* CCD-TRV112/TRV212 are the same as those for the model CCD-TRV12/TRV22 (US model) except for the color the cabinet.
CCD-TRV12 → CCD-TRV112, CCD-TRV22 → CCD-TRV212

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. Flexible Circuit Board Repairing
Keep the temperature of the soldering iron around 270 °C during repairing.
Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
Be careful not to apply force on the conductor when soldering or unsoldering.

TABLE OF CONTENTS

1. BLOCK DIAGRAMS
1-1. OVERALL BLOCK DIAGRAM 1-1
1-2. CAMERA BLOCK DIAGRAM 1-4
1-3. VIDEO/AUDIO BLOCK DIAGRAM 1-7
1-4. SYSTEM CONTROL BLOCK DIAGRAM 1-9
1-5. SERVO BLOCK DIAGRAM 1-11
1-6. MODE CONTROL BLOCK DIAGRAM 1-15
1-7. LCD/EVF BLOCK DIAGRAM (TYPE A) 1-17
1-8. LCD/EVF BLOCK DIAGRAM (TYPE B) 1-19
1-9. POWER BLOCK DIAGRAM 1-21

2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS
2-1. FRAME SCHEMATIC DIAGRAM 2-1
2-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS 2-4
- CD-147 (CCD IMAGER) SCHEMATIC DIAGRAM 2-4
- VC-167 (CAMERA 2) SCHEMATIC DIAGRAM 2-5
- VC-167 (CAMERA 3) SCHEMATIC DIAGRAM 2-8
- VC-167 (VIDEO 1) SCHEMATIC DIAGRAM 2-11
- JK-146 (JACK) SCHEMATIC DIAGRAM 2-14
- VC-167 (MODE CONTROL), FP-249 (MODE SENSOR) SCHEMATIC DIAGRAMS 2-15
- VC-167 (AUDIO AMP), MA-266 (AUDIO) SCHEMATIC DIAGRAMS 2-17
- DD-80 (POWER) SCHEMATIC DIAGRAM 2-18
- VF-102 (EVF) SCHEMATIC DIAGRAM 2-19
- PD-67 (LCD) (TYPE A) SCHEMATIC DIAGRAM 2-20
- PD-67 (LCD) (TYPE B) SCHEMATIC DIAGRAM 2-23
- SD-21 (R.G.B DECODER) (TYPE A) SCHEMATIC DIAGRAM 2-26
- SD-21 (R.G.B DECODER) (TYPE B) SCHEMATIC DIAGRAM 2-29
- CF-42 (SYSTEM CONTROL) PRINTED WIRING BOARD 2-33
- CF-42 (SYSTEM CONTROL) SCHEMATIC DIAGRAM 2-35
- TZ-5 (STEADY SHOT) SCHEMATIC DIAGRAM 2-37

3. DIFFERENT PARTS LIST
3-1. EXPLODED VIEWS 3-1
3-1-1. CABINET (L), F PANEL SECTION 3-1
3-1-2. CABINET (R) SECTION 3-2
3-1-3. EVF SECTION 3-4
3-1-4. MAIN SECTION 3-5
3-1-5. CASSETTE COMPARTMENT BLOCK SECTION 3-6
3-1-6. LS CHASSIS BLOCK SECTION 3-7
3-1-7. MECHANISM CHASSIS BLOCK SECTION 3-8
3-2. ELECTRICAL PARTS LIST 3-9

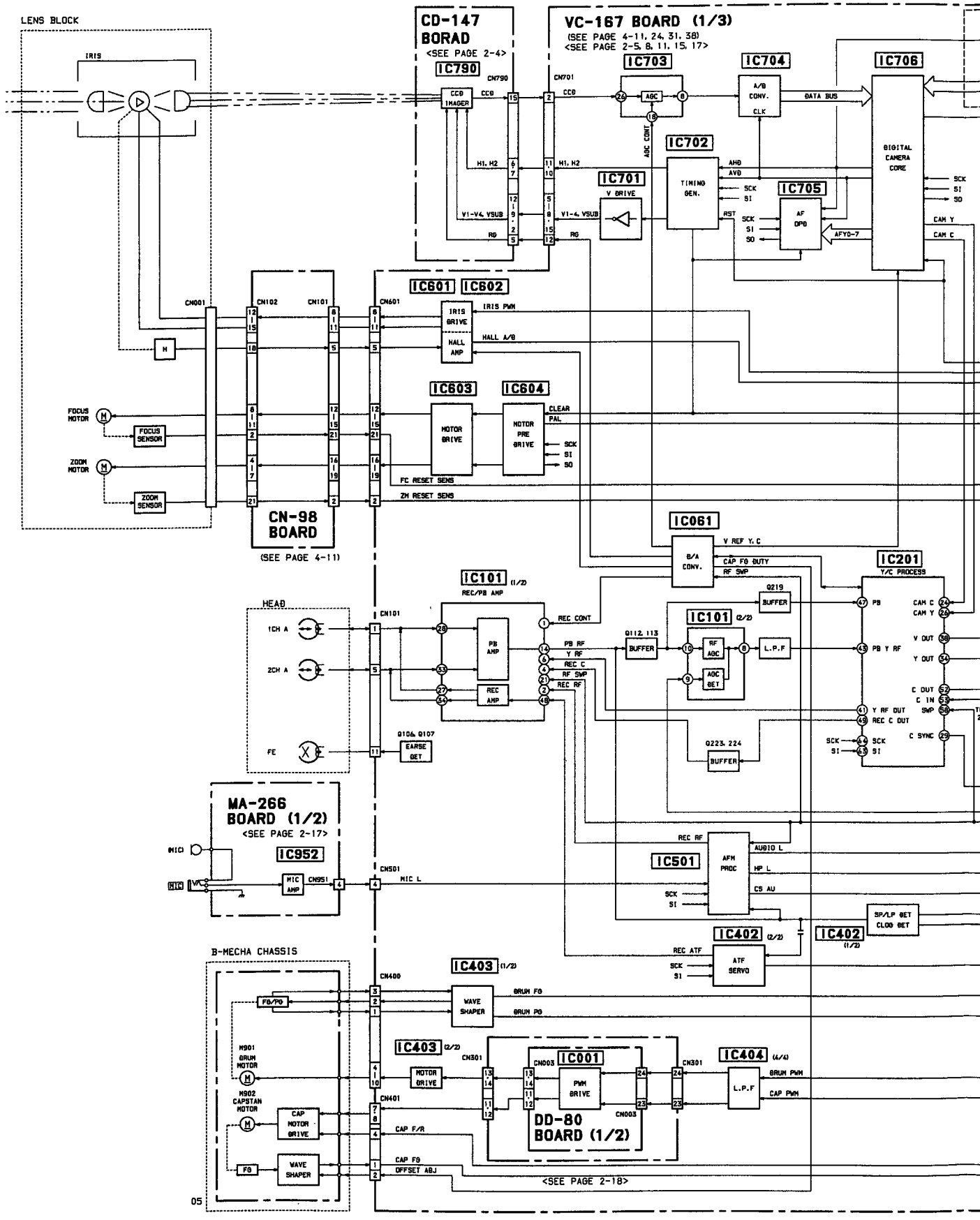
4. ADJUSTMENTS
4-1. CAMERA SECTION ADJUSTMENT 4-1
4-1-1. CAMERA SYSTEM ADJUSTMENTS 4-1
1-1. LCD system adjustments (PD-67 board) 4-1
1-1. EVR intial data input 4-2
1-2. –7.5 Vadjustment 4-3
1-3. VCO adjustment 4-3
1-4. Horizntal display position adjustment 4-4
1-5. D RANGE adjustment 4-5
1-6-1. BRIGHT adjustment (TYPE A) 4-6
1-6-2. BRIGHT adjustment (TYPE B) 4-7
1-7-1. CONTRAST adjustment (TYPE A) 4-8
1-7-2. CONTRAST adjustment (TYPE B) 4-9
1-8. V-COM level adjustment 4-10
1-9. COLOR adjustment 4-11
1-10. HUE adjustment (NTSC model only) 4-12
1-11. BURST CLEANING adjustment 4-12
1-12. V-COM adjustment 4-13
1-13. White balance adjustment 4-14
1-2. PREPARATIONS BEFORE ADJUSTEMNT 4-15
2-1. Precautions 4-15
1. Switch settings 4-15
2. Adjustment sequence 4-15
3. Subject 4-15
2-2. Page F data modification 4-16
2-3. Flange back adjustment 4-17
2-4. Camera-shaking correction adjustment 4-18

* The color reproduction frame is shown after the page of 2-4. Camera-shaking correction adjustment.

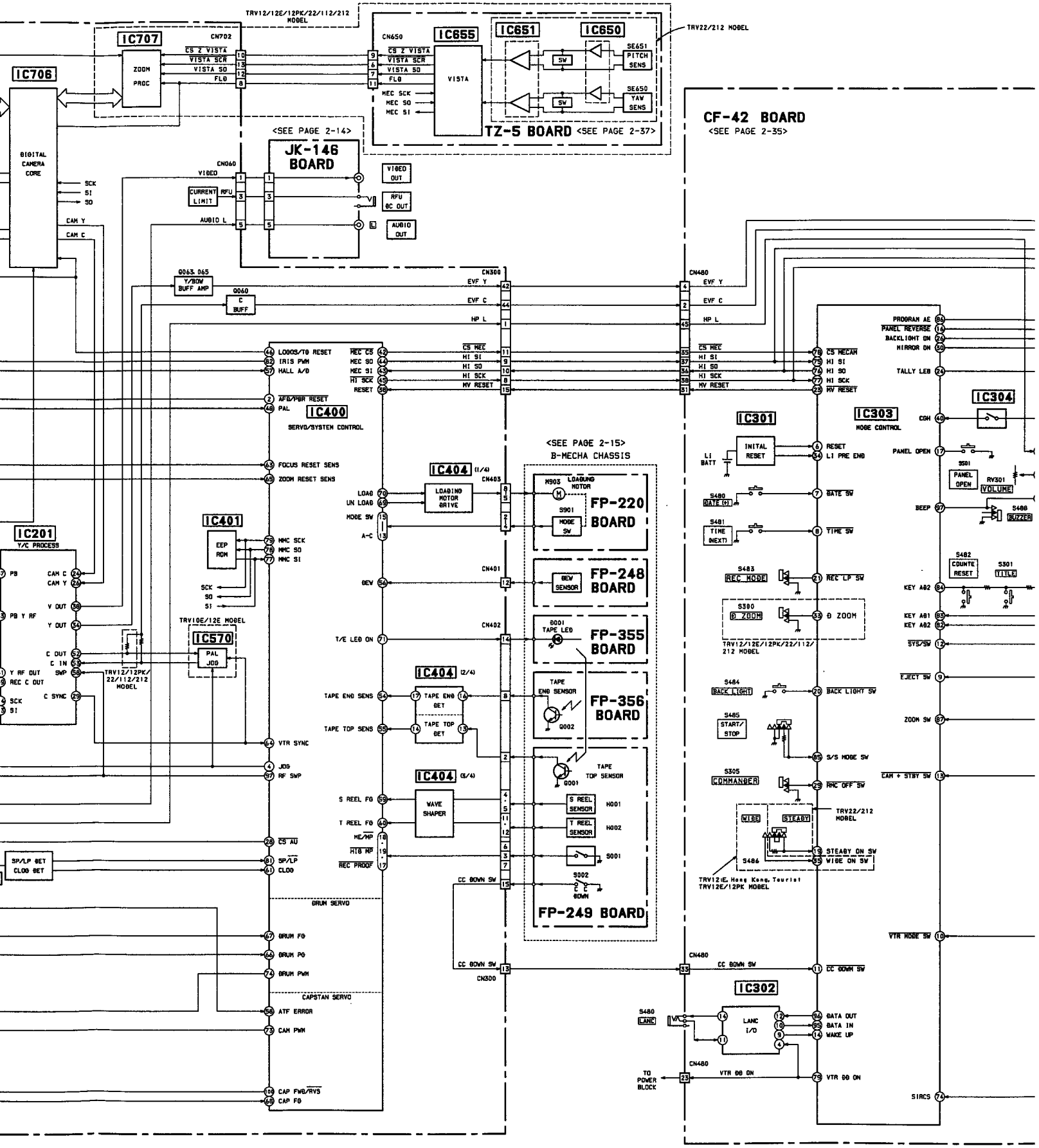
(SEE PAGE □□) : Pages on the original service manual.
<SEE PAGE □□> : Pages on this service manual.

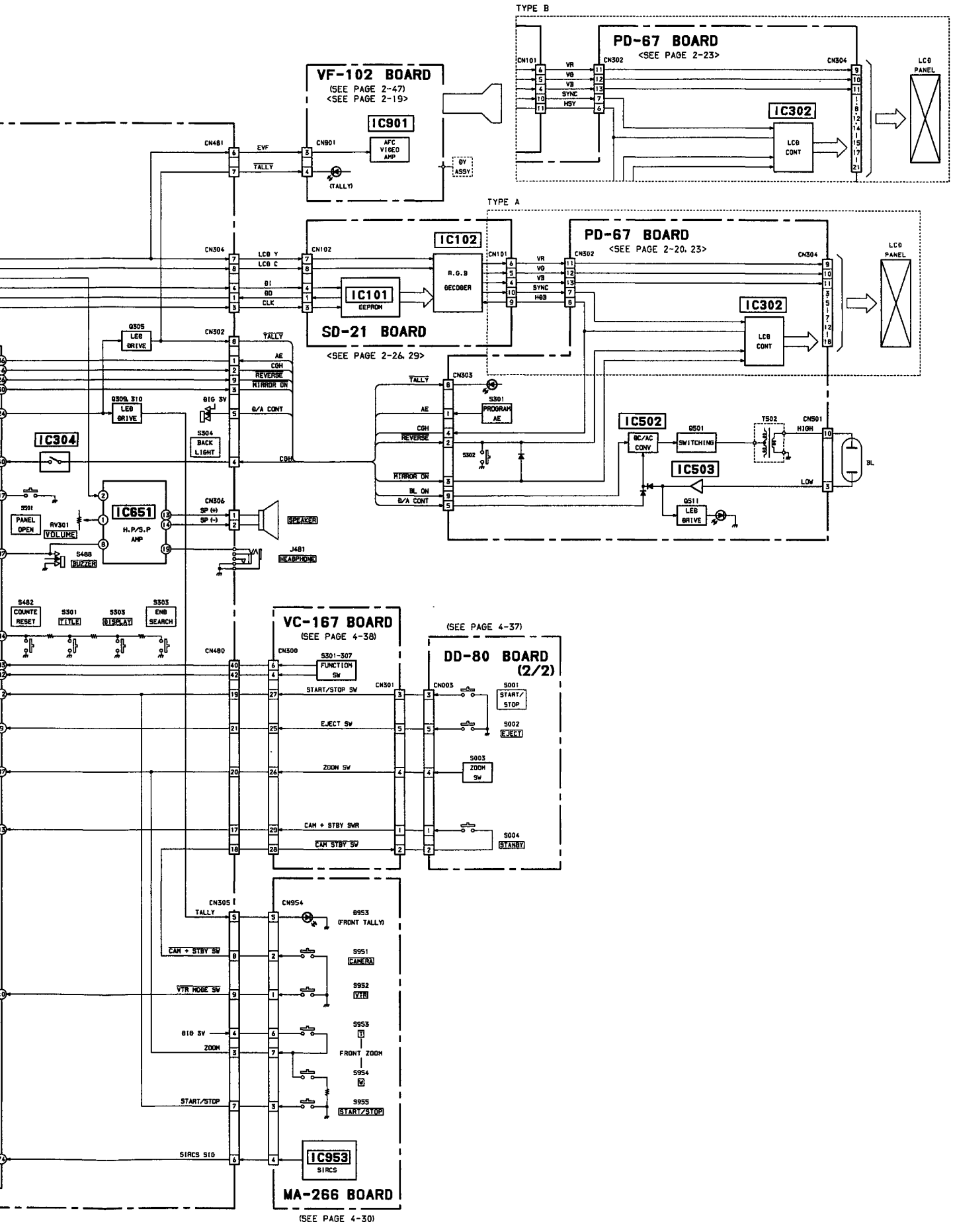
SECTION 1
BLOCK DIAGRAMS

1-1. OVERALL BLOCK DIAGRAM

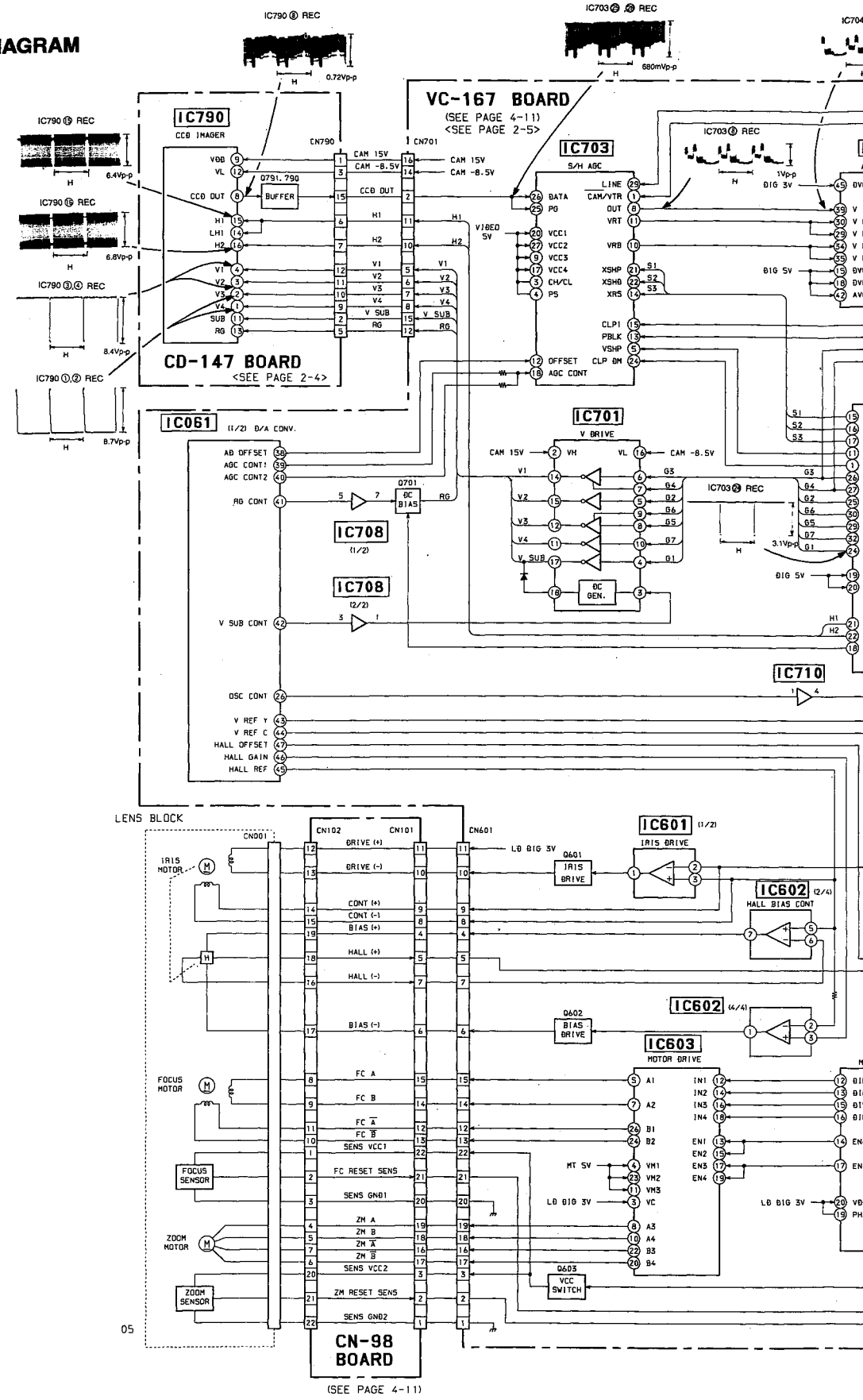


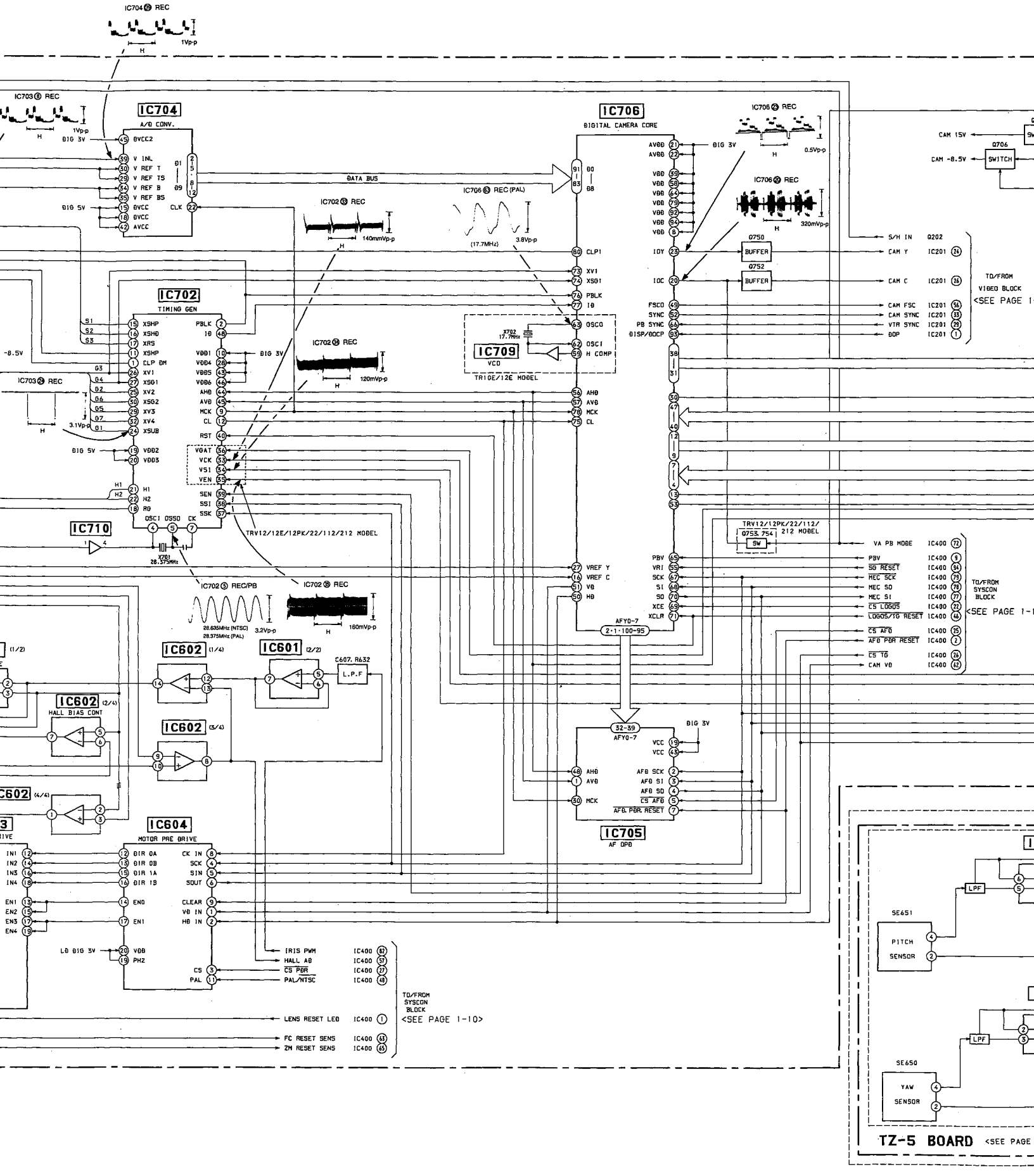
vice manual.
nual.

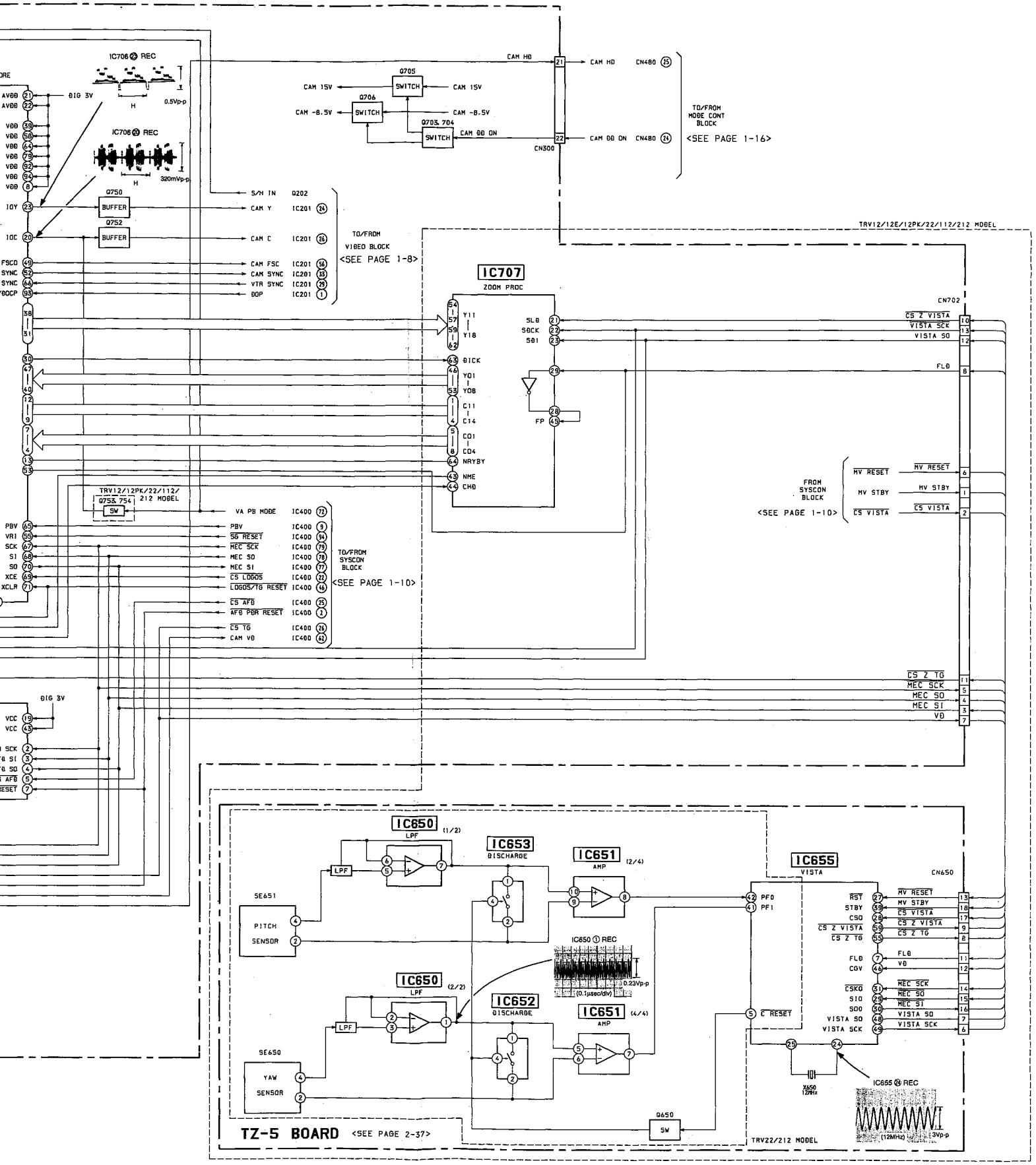



TYPE B
PD-67 BOARD
<SEE PAGE 2-23>
VF-102 BOARD
(SEE PAGE 2-47)
<SEE PAGE 2-19>
IC901
AFC VIDEO AMP
IC302
LCD CONT
LCD PANEL
TYPE A
PD-67 BOARD
<SEE PAGE 2-20, 23>
IC102
R.G.B DECODER
IC101
EEPROM
SD-21 BOARD
<SEE PAGE 2-26, 29>
IC304
IC651
H.P/S.P AMP
IC502
DC/AC CONV
IC503
Q501 SWITCHING
Q511 LED DRIVE
Q305 LED DRIVE
Q309, 310 LED DRIVE
S304 BACK LIGHT
S301 PROGRAM AE
S501 PANEL OPEN
RV301 VOLUME
S488 BUZZER
SPEAKER
J481 HEADPHONE
S482 COUNTER RESET
S301 TITLE
S303 DISPLAY
S305 END SEARCH
VC-167 BOARD
(SEE PAGE 4-38)
(SEE PAGE 4-37)
DD-80 BOARD (2/2)
S301-307 FUNCTION SW
START/STOP SW
EJECT SW
ZOOM SW
CAM + STBY SWR
CAM STBY SW
S001 START/STOP
S002 EJECT
S003 ZOOM SW
S004 STANDBY
MA-266 BOARD
(SEE PAGE 4-30)
IC953 SIRCS
S951 CAMERA
S952 VTR
S953 FRONT ZOOM
S954
S955 START/STOP
B953 (FRONT TALLY)
TALLY
CAM + STBY SW
VTR MODE SW
810 5V
ZOOM
START/STOP
SIRCS SIG

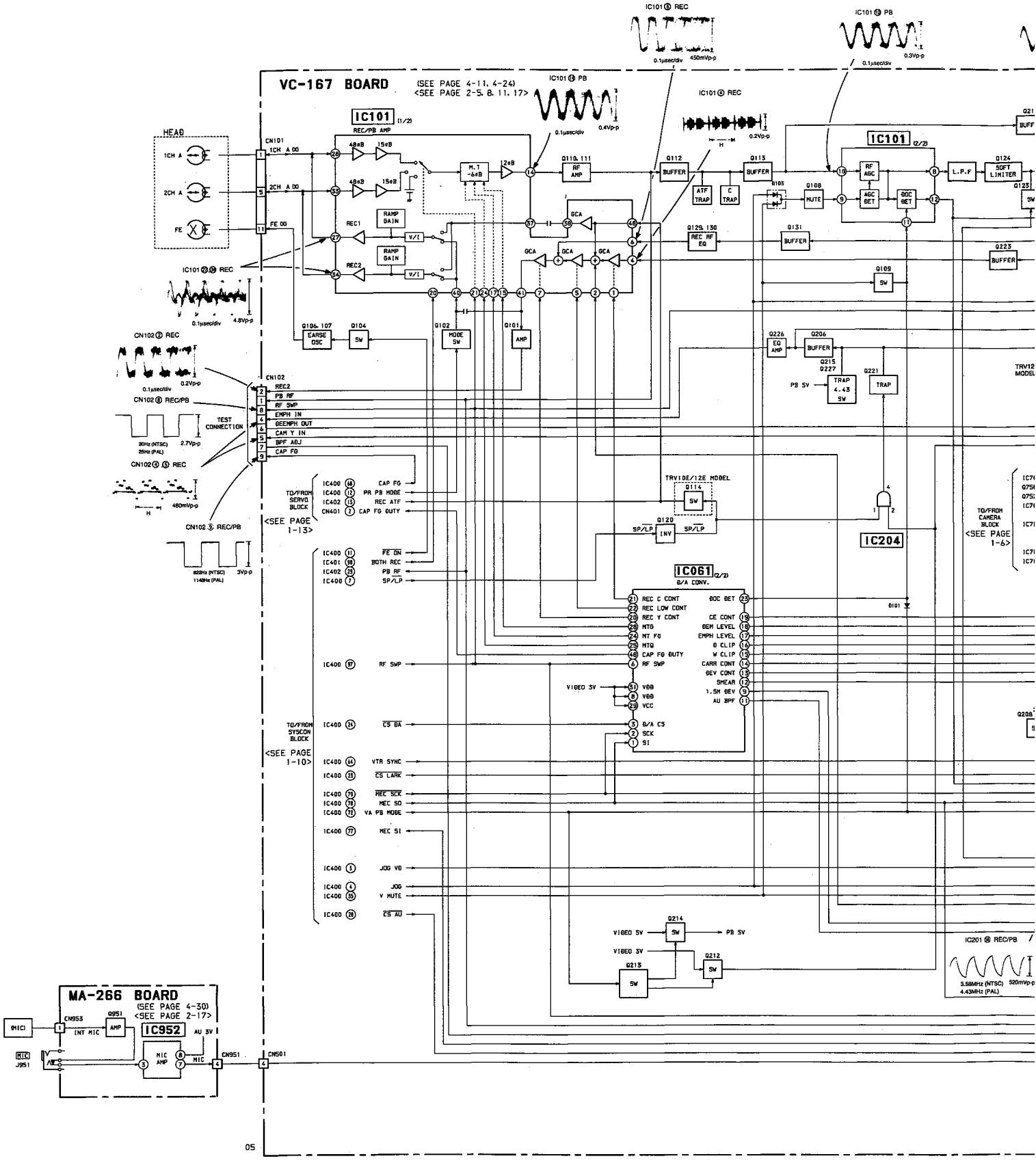
1-2. CAMERA BLOCK DIAGRAM

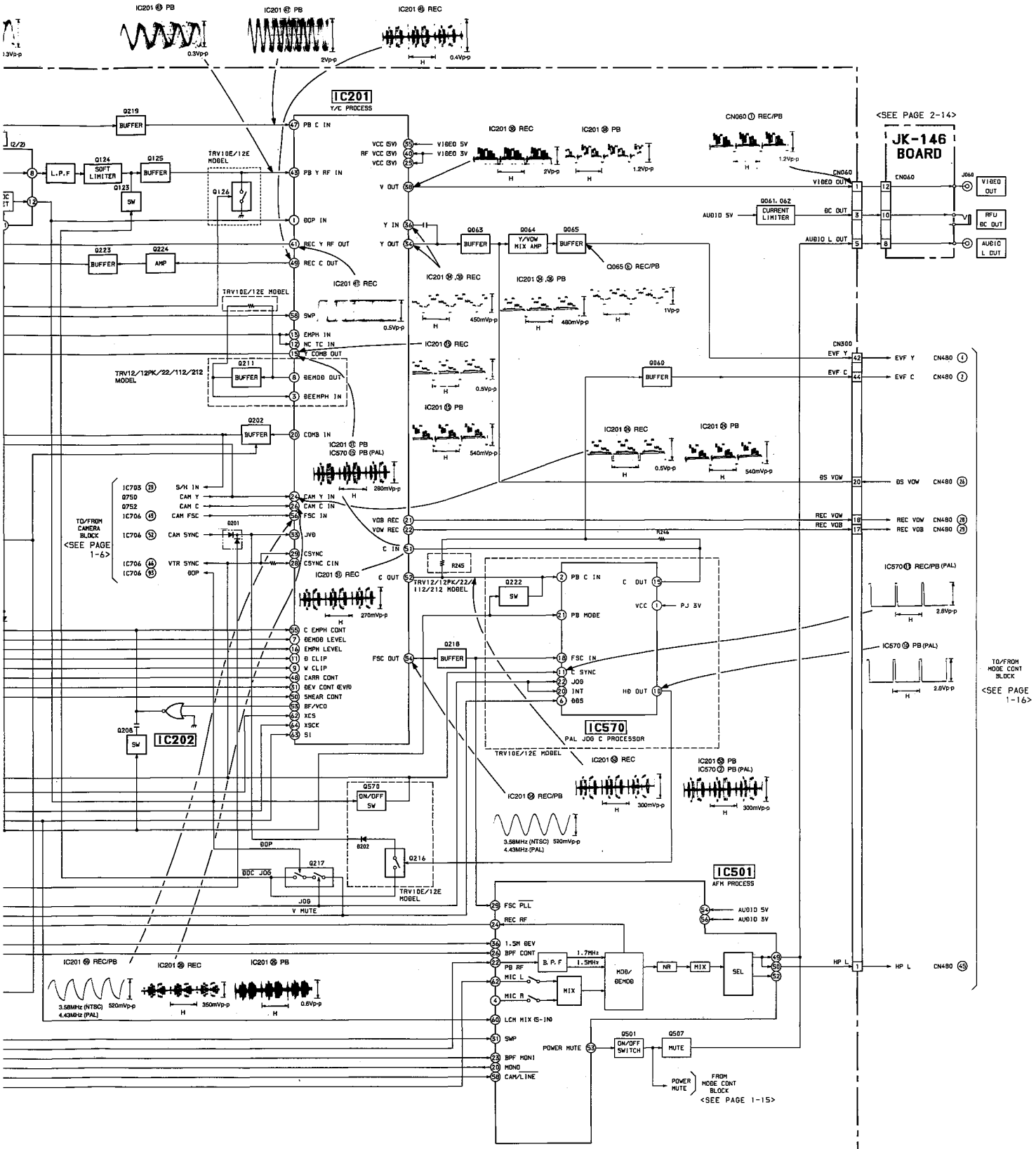



IC704 A/D CONV.
IC706 DIGITAL CAMERA CORE
IC702 TIMING GEN
IC709 VCO
IC710
IC602 (1/4)
IC601 (2/2)
IC602 (2/4) HALL BIAS CONT
IC602 (3/4)
IC602 (4/4)
IC604 MOTOR PRE DRIVE
IC705 AF DPB
DATA BUS
TRV12/12E/12PK/22/112/212 MODEL
TRV12/12PK/22/112/212 MODEL
TRI0E/12E MODEL
L.P.F
HALL BIAS CONT
TO/FROM VIDEO BLOCK
TO/FROM SYSCON BLOCK
<SEE PAGE 1-10>
SE651
PITCH SENSOR
SE650
YAW SENSOR
TZ-5 BOARD

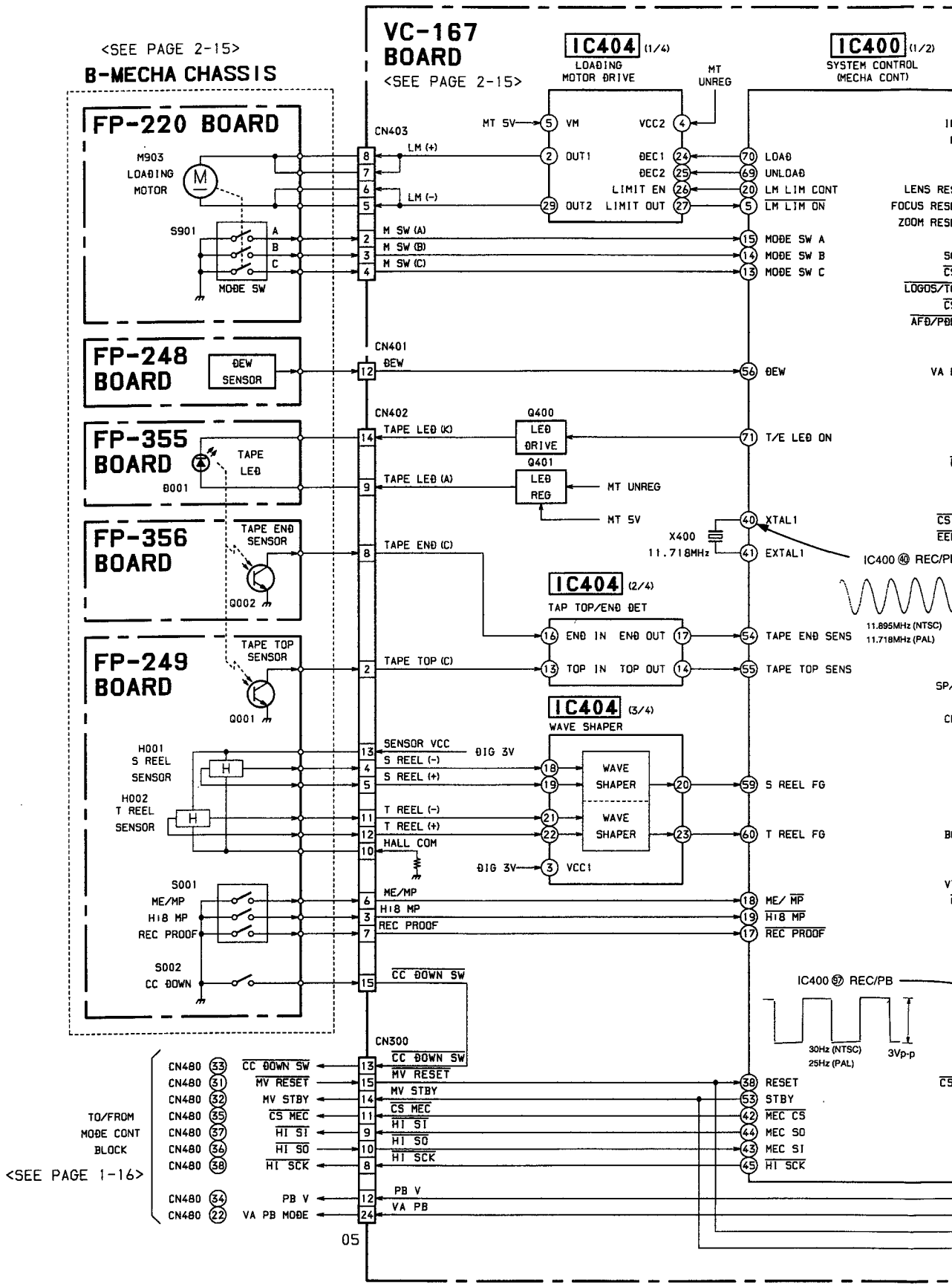

IC706 ② REC
0.5Vp-p
IC706 ⑳ REC
320mVp-p
DIG 3V
CAM HD
CAM 15V
CAM -8.5V
CAM DD ON
Q705 SWITCH
Q706 SWITCH
Q703, 704 SWITCH
CN300
CN480 ㉑
CN480 ㉒
TO/FROM MODE CONT BLOCK
<SEE PAGE 1-16>
Q750 BUFFER
Q752 BUFFER
S/H IN Q202
CAM Y IC201 ㉔
CAM C IC201 ㉖
CAM FSC IC201 ㊿
CAM SYNC IC201 ㉝
VTR SYNC IC201 ㉙
DOP IC201 ①
TO/FROM VIDEO BLOCK
<SEE PAGE 1-8>
TRV12/12E/12PK/22/112/212 MODEL
IC707
ZOOM PROC
Y11
Y18
SLD
SCK
SDI
DICK
YO1
YO8
C11
C14
CO1
CO4
NRYBY
NME
CHD
FP
CN702
CS Z VISTA
VISTA SCK
VISTA SO
FLD
MV RESET
MV STBY
CS VISTA
FROM SYSCON BLOCK
<SEE PAGE 1-10>
TRV12/12PK/22/112/212 MODEL
Q758, 754 SW
VA PB MODE IC400 ⑫
PBV IC400 ⑨
SG RESET IC400 ⑭
MEC SCK IC400 ⑮
MEC SO IC400 ⑱
MEC SI IC400 ⑰
CS LOGOS IC400 ㉒
LOGOS/TG RESET IC400 ㊻
CS AFD IC400 ㉕
AFD PDR RESET IC400 ①
CS TG IC400 ㉖
CAM VD IC400 ㊷
TO/FROM SYSCON BLOCK
<SEE PAGE 1-10>
CS Z TG
MEC SCK
MEC SO
MEC SI
VD
IC650 (1/2) LPF
IC653 DISCHARGE
IC651 (2/4) AMP
IC655 VISTA
CN650
SE651
PITCH SENSOR
IC650 ① REC
0.23Vp-p
(0.1μsec/div)
IC650 (2/2) LPF
IC652 DISCHARGE
IC651 (4/4) AMP
SE650
YAW SENSOR
PFO
PF1
C RESET
RST
STBY
CSO
CSKO
SIO
SOO
VISTA SO
VISTA SCK
X650 12MHz
IC655 ㉘ REC
(12MHz)
3Vp-p
Q650 SW
TZ-5 BOARD
<SEE PAGE 2-37>
TRV22/212 MODEL

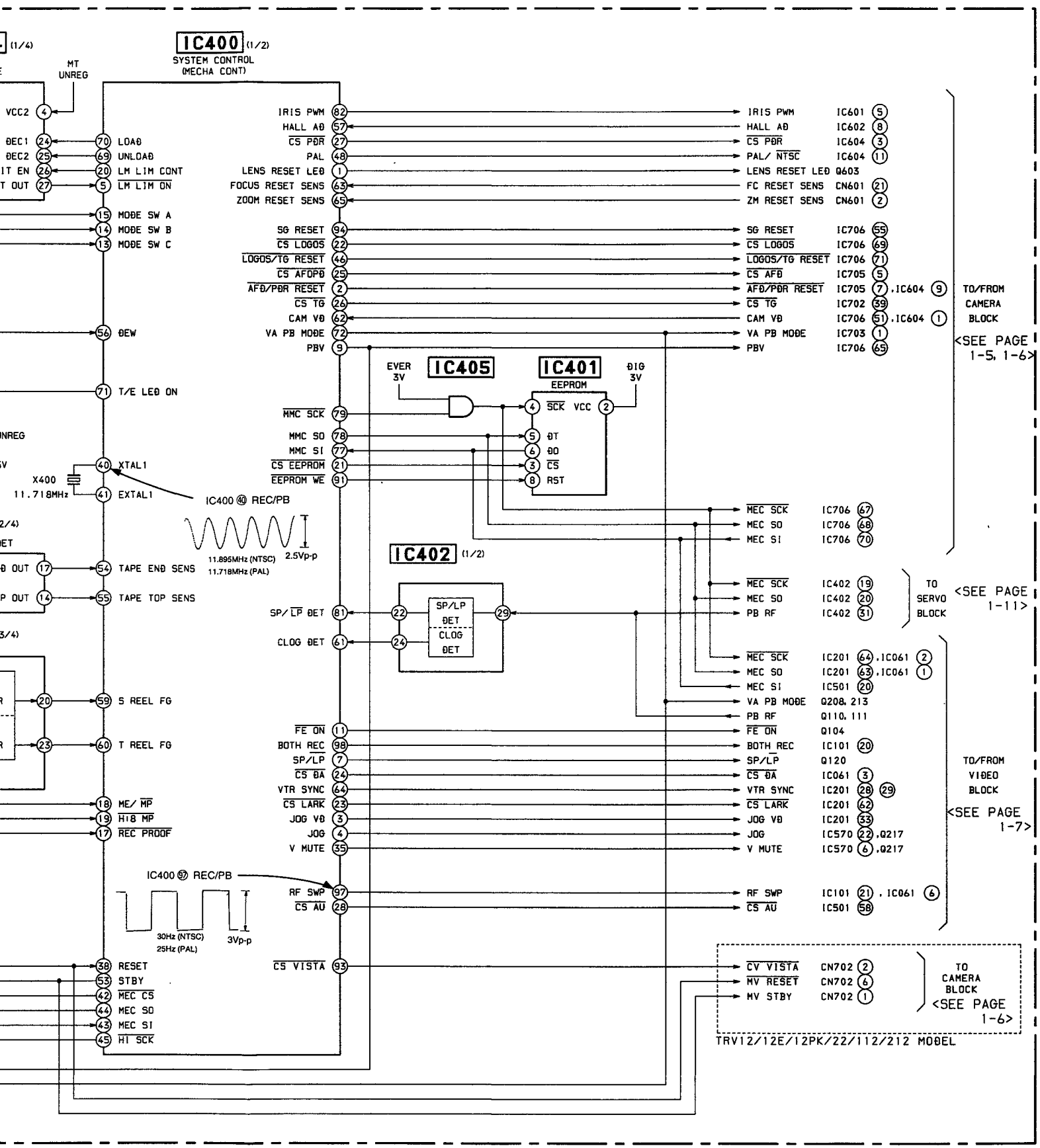
1-3. VIDEO/AUDIO BLOCK DIAGRAM



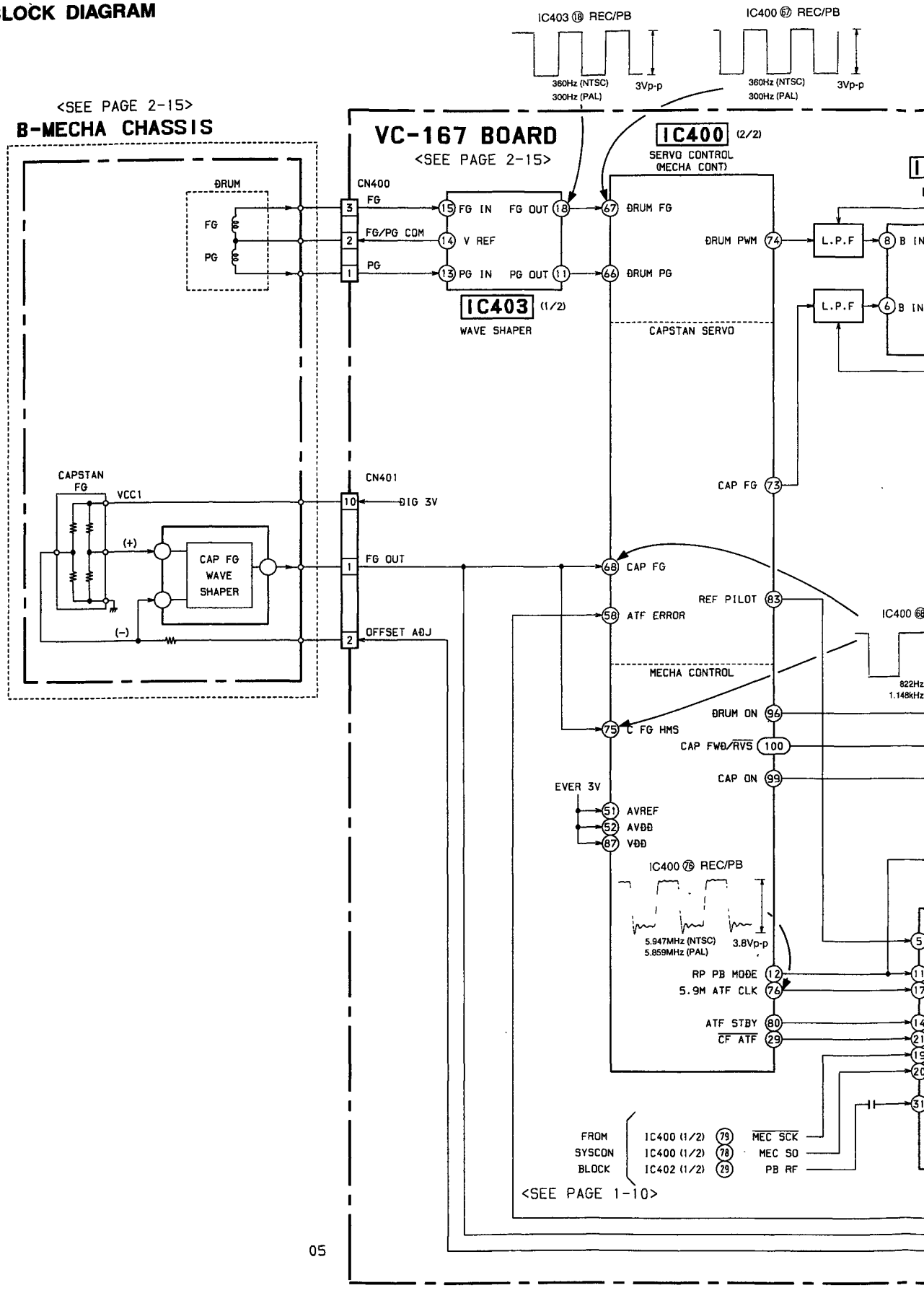

IC201
Y/C PROCESS
IC202
IC501
AFM PROCESS
IC570
PAL JOG C PROCESSOR
JK-146
BOARD
<SEE PAGE 2-14>
TRV10E/12E MODEL
TRV12/12PK/22/112/212 MODEL
TO/FROM CAMERA BLOCK
<SEE PAGE 1-6>
TO/FROM MODE CONT BLOCK
<SEE PAGE 1-16>
FROM MODE CONT BLOCK
<SEE PAGE 1-15>
BUFFER
L.P.F
SOFT LIMITER
SW
AMP
Y/CVOM MIX AMP
CURRENT LIMITER
ON/OFF SW
MUTE
B.P.F
MOD/DEMOD
NR
MIX
SEL
PB Y RF IN
REC Y RF OUT
REC C OUT
V OUT
Y IN
Y OUT
PB C IN
C IN
C OUT
SWP
EMPH IN
NC TC IN
Y COMB OUT
DEMOD OUT
DEEMPH IN
COMB IN
CAM Y IN
CAM C IN
FSC IN
JVD
CSYNC
CSYNC CIN
BOP
VOB REC
VOW REC
C EMPH CONT
DEMOD LEVEL
EMPH LEVEL
B CLIP
W CLIP
CARR CONT
DEV CONT (EVR)
SMEAR CONT
BF/VCO
XCS
XSCK
SI
FSC OUT
FSC PLL
REC RF
1.5M DEV
BPF CONT
PB RF
MIC L
MIC R
LCH MIX IN
BPF MONI
MONO
CAM/LINE
POWER MUTE
JOG
V MUTE
BOC JOG
PB MODE
FSC IN
C SYNC
JOG
INT
HD OUT
VIDEO OUT
BC OUT
AUDIO L OUT
EVF Y
EVF C
OS VOW
REC VOW
REC VOB
HP L
AUDIO 5V
AUDIO 3V
VIDEO 5V
VCC (5V)
RF VCC (5V)
VCC (3V)
PJ 3V
IC201 REC
IC201 PB
IC201 REC/PB
IC570 PB (PAL)
IC570 REC/PB (PAL)
CN060 REC/PB
3.58MHz (NTSC) 520mVp-p
4.43MHz (PAL)

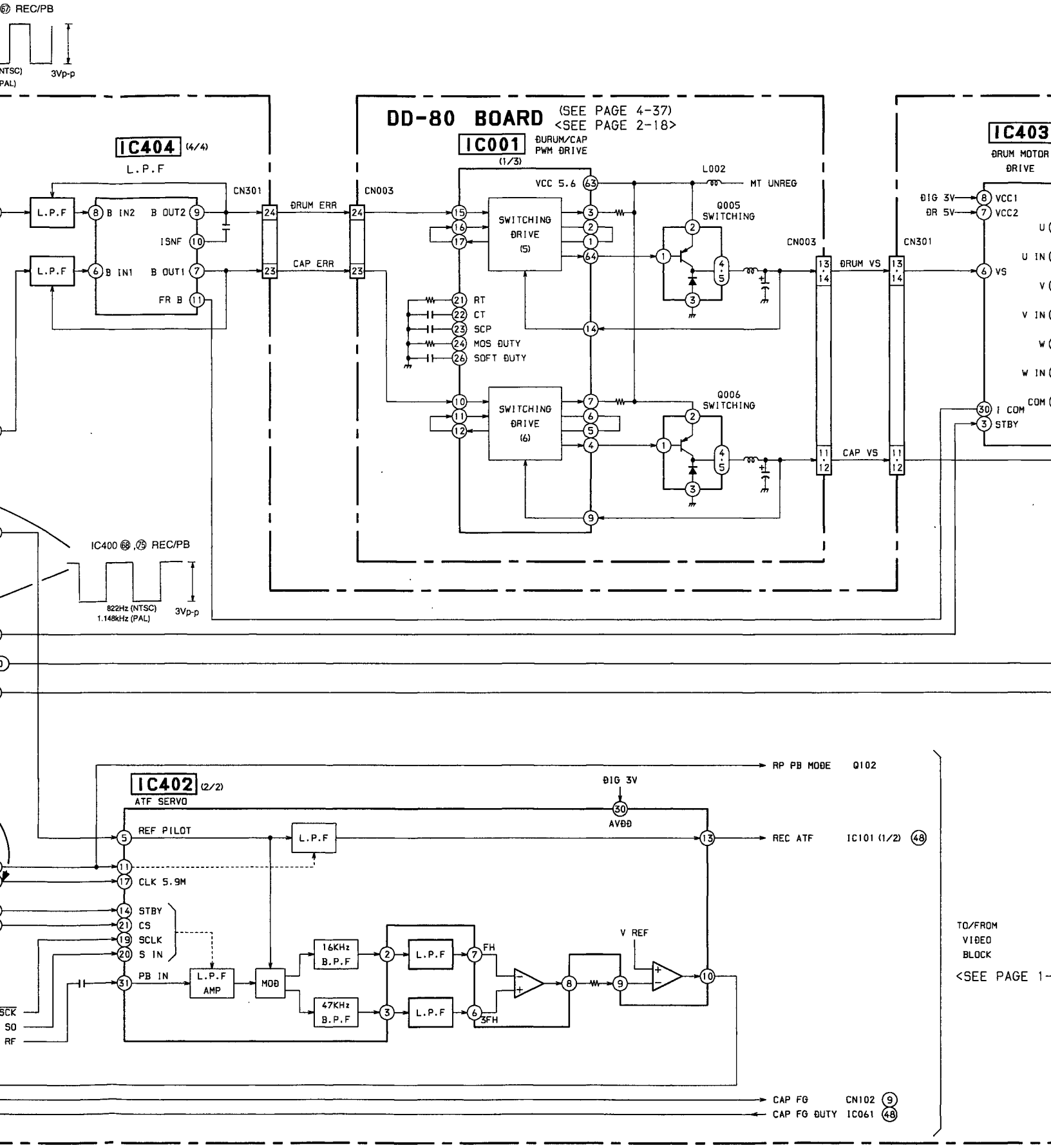
1-4. SYSTEM CONTROL BLOCK DIAGRAM

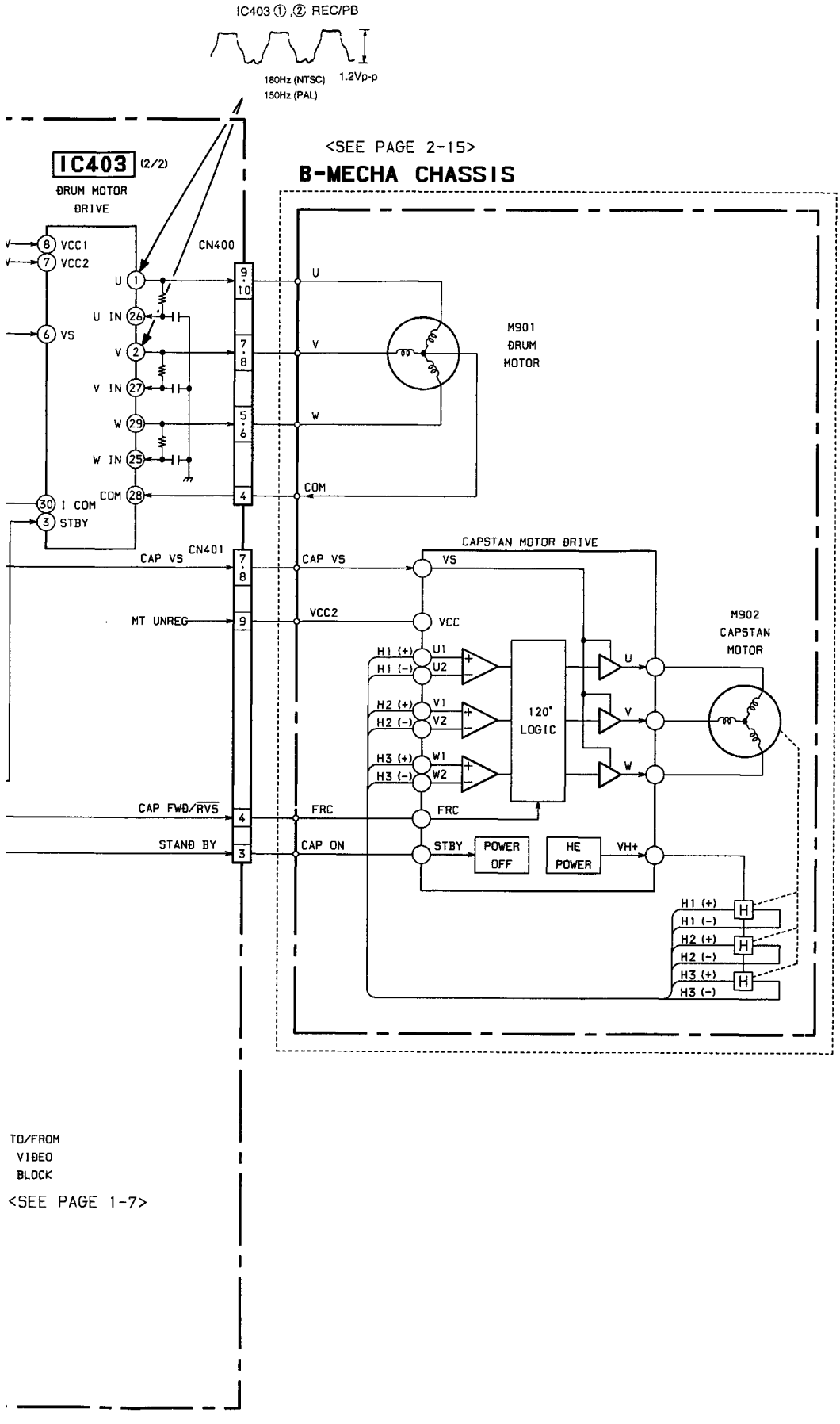



IC400 (1/2)
SYSTEM CONTROL
(MECHA CONT)
MT
UNREG
VCC2 4
DEC1 24
DEC2 25
IT EN 26
T OUT 27
70 LOAD
69 UNLOAD
20 LM LIM CONT
5 LM LIM ON
15 MODE SW A
14 MODE SW B
13 MODE SW C
56 DEW
71 T/E LED ON
40 XTAL1
41 EXTAL1
X400
11.718MHz
54 TAPE END SENS
55 TAPE TOP SENS
59 S REEL FG
60 T REEL FG
18 ME/ MP
19 Hi8 MP
17 REC PROOF
38 RESET
53 STBY
42 MEC CS
44 MEC SO
43 MEC SI
45 HI SCK
IRIS PWM 82
HALL AD 57
CS PDR 27
PAL 48
LENS RESET LED 1
FOCUS RESET SENS 63
ZOOM RESET SENS 65
SG RESET 94
CS LOGOS 22
LOGOS/TG RESET 46
CS AFDPD 25
AFD/PDR RESET 2
CS TG 26
CAM VD 62
VA PB MODE 72
PBV 9
MMC SCK 79
MMC SO 78
MMC SI 77
CS EEPROM 21
EEPROM WE 91
SP/LP DET 81
CLOG DET 61
FE ON 11
BOTH REC 98
SP/LP 7
CS DA 24
VTR SYNC 64
CS LARK 23
JOG VD 3
JOG 4
V MUTE 35
RF SWP 97
CS AU 28
CS VISTA 93
IC400 (40) REC/PB
11.895MHz (NTSC)
11.718MHz (PAL)
2.5Vp-p
IC400 (97) REC/PB
30Hz (NTSC)
25Hz (PAL)
3Vp-p
EVER 3V
IC405
IC401
EEPROM
DIG 3V
SCK VCC
DT
DO
CS
RST
IC402 (1/2)
SP/LP DET
CLOG DET
IRIS PWM IC601 5
HALL AD IC602 8
CS PDR IC604 3
PAL/ NTSC IC604 11
LENS RESET LED Q603
FC RESET SENS CN601 21
ZM RESET SENS CN601 2
SG RESET IC706 55
CS LOGOS IC706 69
LOGOS/TG RESET IC706 71
CS AFD IC705 5
AFD/PDR RESET IC705 7 ,IC604 9
CS TG IC702 39
CAM VD IC706 51 ,IC604 1
VA PB MODE IC703 1
PBV IC706 65
TO/FROM CAMERA BLOCK
<SEE PAGE 1-5, 1-6>
MEC SCK IC706 67
MEC SO IC706 68
MEC SI IC706 70
MEC SCK IC402 19
MEC SO IC402 20
PB RF IC402 31
TO SERVO BLOCK
<SEE PAGE 1-11>
MEC SCK IC201 64 ,IC061 2
MEC SO IC201 63 ,IC061 1
MEC SI IC501 20
VA PB MODE Q208, 213
PB RF Q110, 111
FE ON Q104
BOTH REC IC101 20
SP/LP Q120
CS DA IC061 3
VTR SYNC IC201 28 29
CS LARK IC201 62
JOG VD IC201 33
JOG IC570 22 ,Q217
V MUTE IC570 6 ,Q217
TO/FROM VIDEO BLOCK
<SEE PAGE 1-7>
RF SWP IC101 21 , IC061 6
CS AU IC501 58
CV VISTA CN702 2
MV RESET CN702 6
MV STBY CN702 1
TO CAMERA BLOCK
<SEE PAGE 1-6>
TRV12/12E/12PK/22/112/212 MODEL

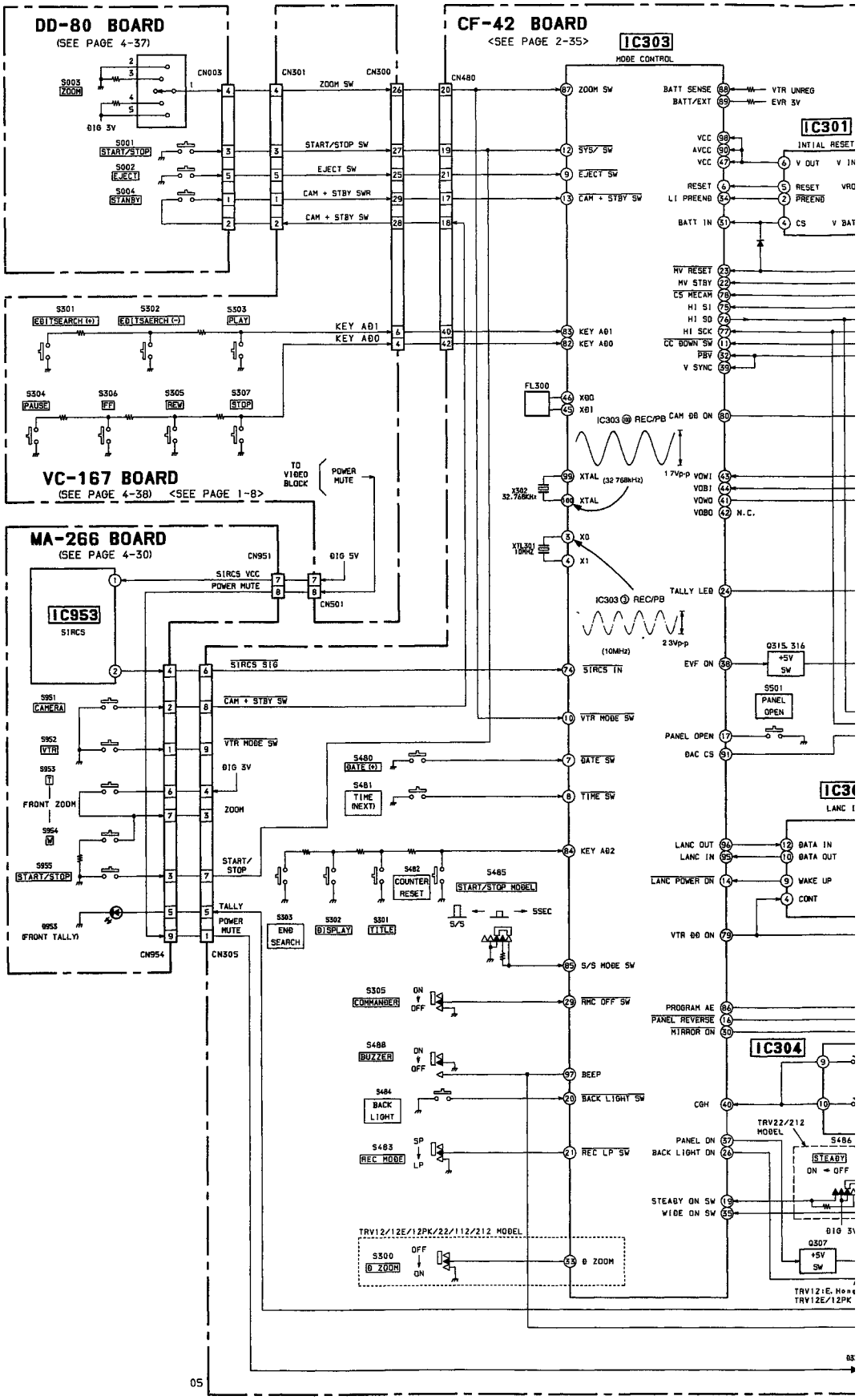
1-5. SERVO BLOCK DIAGRAM

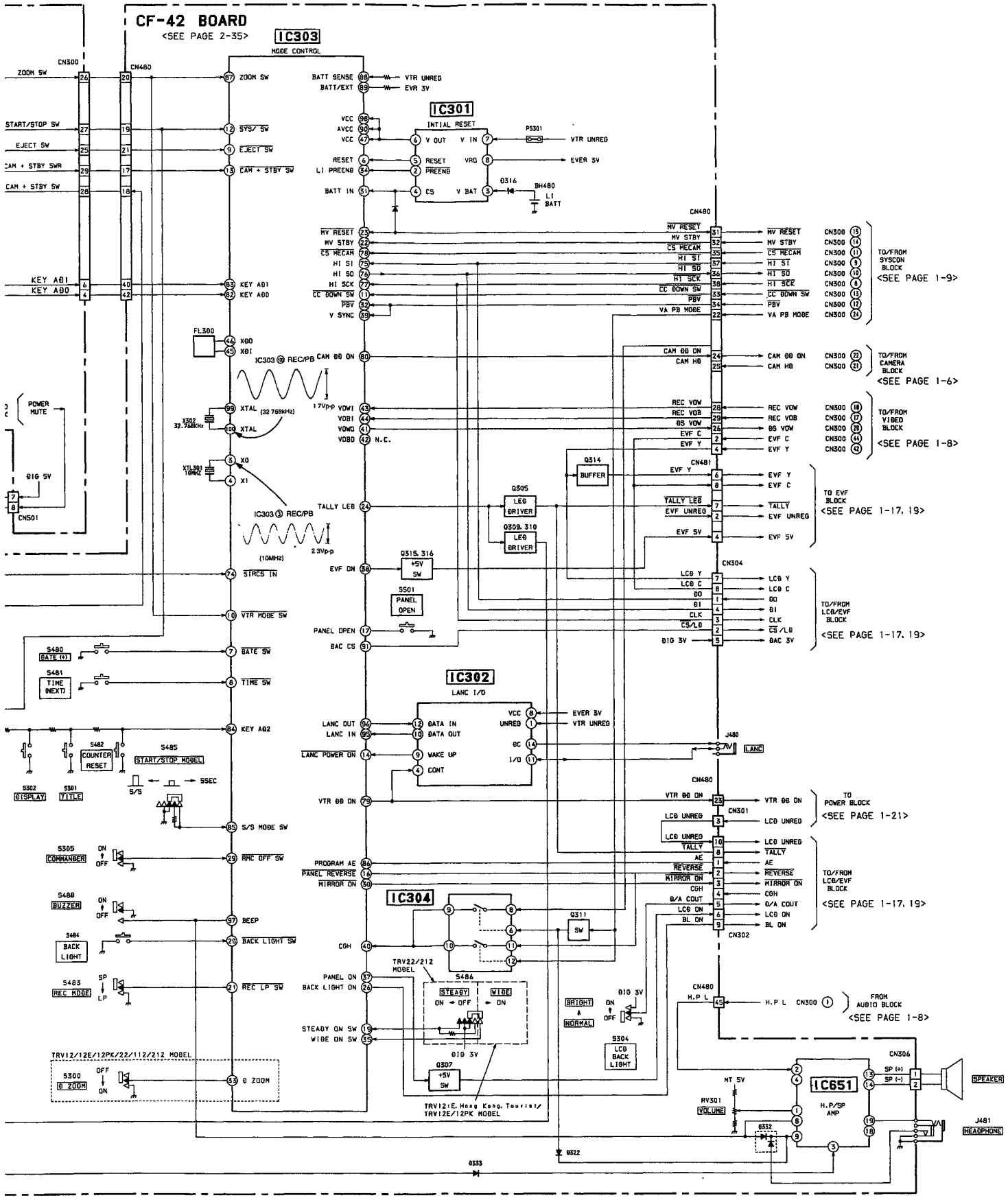



REC/PB
NTSC)
PAL)
3Vp-p
DD-80 BOARD (SEE PAGE 4-37) <SEE PAGE 2-18>
IC404 (4/4)
L.P.F
IC001
ØURUM/CAP PWM ØRIVE
(1/3)
IC403
ØRUM MOTOR ØRIVE
CN301
CN003
ØRUM ERR
CAP ERR
L.P.F
B IN2
B OUT2
ISNF
B IN1
B OUT1
FR B
VCC 5.6
L002
MT UNREG
Q005 SWITCHING
SWITCHING ØRIVE (5)
RT
CT
SCP
MOS ØUTY
SOFT ØUTY
Q006 SWITCHING
SWITCHING ØRIVE (6)
ØRUM VS
CAP VS
ØIG 3V
ØR 5V
VCC1
VCC2
VS
I COM
STBY
IC400 ,
REC/PB
822Hz (NTSC)
1.148kHz (PAL)
3Vp-p
IC402 (2/2)
ATF SERVO
ØIG 3V
AVØØ
REF PILOT
CLK 5.9M
STBY
CS
SCLK
S IN
PB IN
L.P.F AMP
MOØ
16KHz B.P.F
47KHz B.P.F
FH
3FH
V REF
RP PB MOØE Q102
REC ATF IC101 (1/2)
CAP FG CN102
CAP FG ØUTY IC061
TO/FROM VIØEO BLOCK
<SEE PAGE 1-

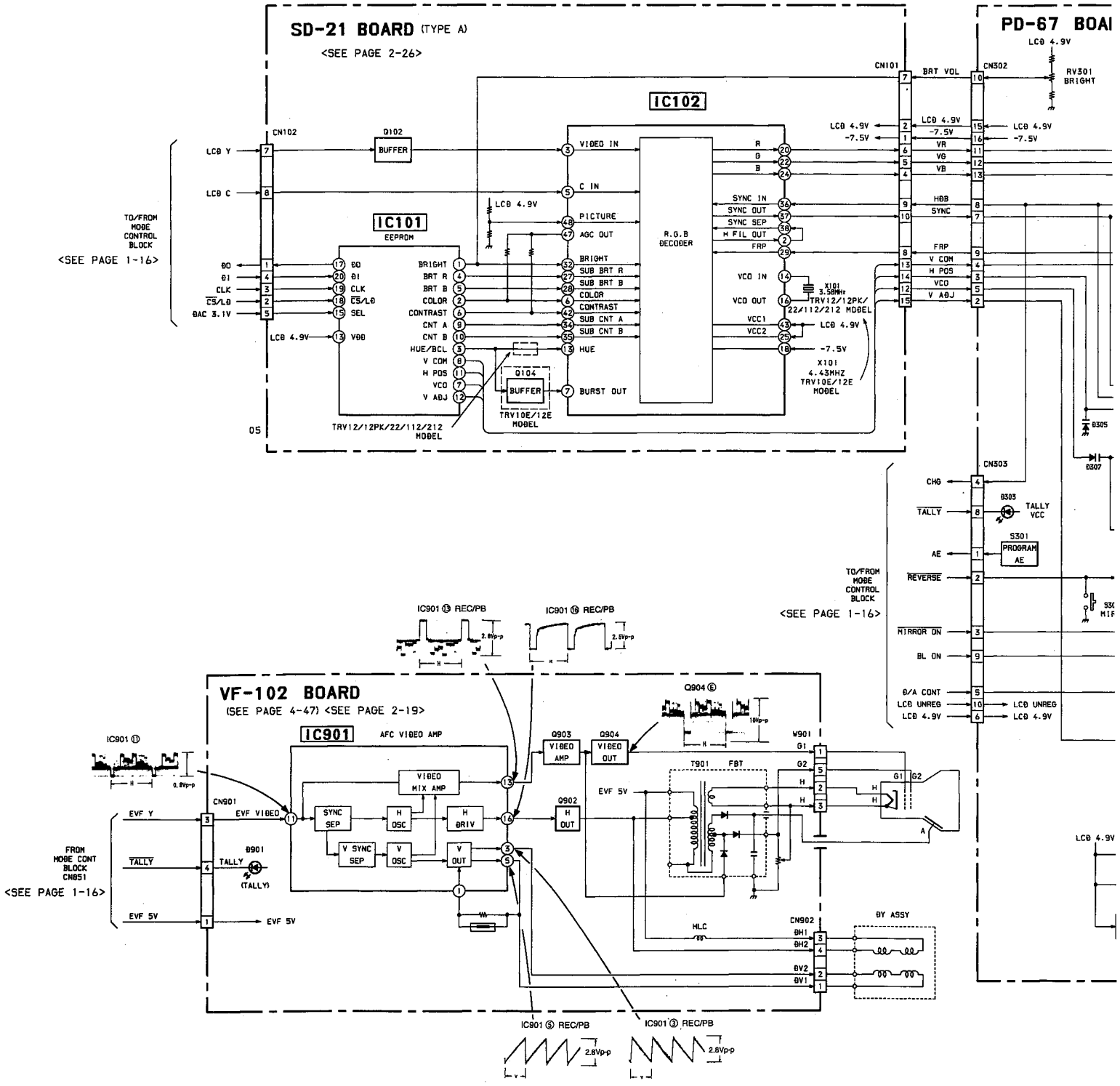

IC403 ①,② REC/PB
180Hz (NTSC)
150Hz (PAL)
1.2Vp-p
<SEE PAGE 2-15>
B-MECHA CHASSIS
IC403 (2/2)
DRUM MOTOR DRIVE
CN400
CN401
VCC1
VCC2
VS
I COM
STBY
U
U IN
V
V IN
W
W IN
COM
M901 DRUM MOTOR
CAP VS
MT UNREG
CAP FWD/REV
STAND BY
CAPSTAN MOTOR DRIVE
VCC
FRC
CAP ON
H1 (+)
H1 (-)
H2 (+)
H2 (-)
H3 (+)
H3 (-)
120° LOGIC
POWER OFF
HE POWER
VH+
M902 CAPSTAN MOTOR
TO/FROM VIDEO BLOCK
<SEE PAGE 1-7>

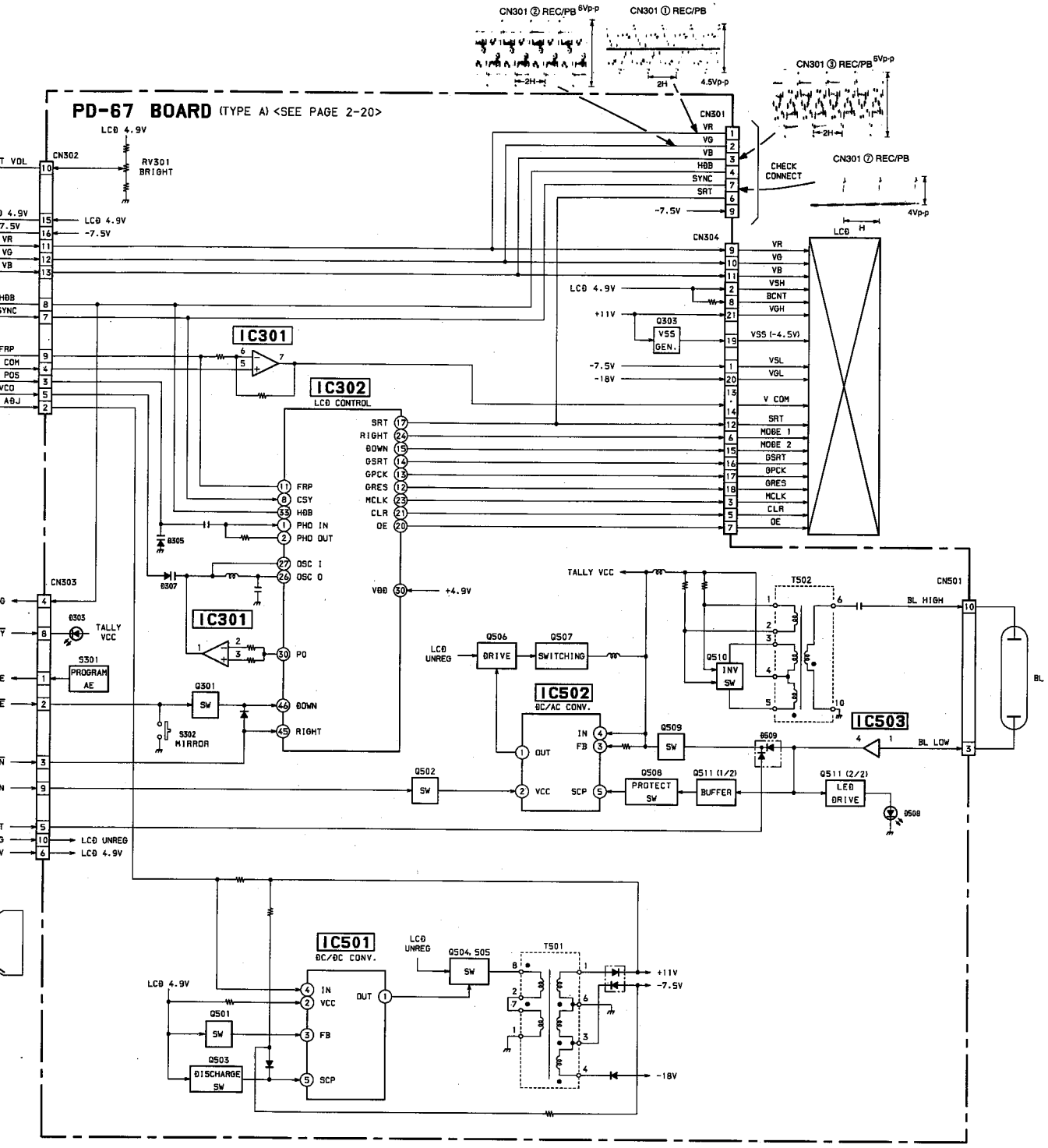
1-6. MODE CONTROL BLOCK DIAGRAM




CF-42 BOARD
<SEE PAGE 2-35>
IC303
MODE CONTROL
IC301
INTIAL RESET
IC302
LANC I/O
IC304
IC651
H.P/SP AMP
ZOOM SW
START/STOP SW
EJECT SW
CAM + STBY SW
KEY A01
KEY A00
POWER MUTE
BATT SENSE
BATT/EXT
VTR UNREG
EVR 3V
PS301
BH480
LI BATT
MV RESET
MV STBY
CS MECAM
HI ST
HI SD
HI SCK
CC DOWN SW
PBV
V SYNC
VA PB MODE
CAM 00 ON
CAM H0
REC/PB
REC VOV
REC VOB
0S VOV
EVF C
EVF Y
XTAL
X501 32.768kHz
XT301 10MHz
TALLY LED
EVF ON
PANEL OPEN
DAC CS
LANC OUT
LANC IN
LANC POWER ON
VTR 00 ON
PROGRAM AE
PANEL REVERSE
MIRROR ON
CGH
PANEL ON
BACK LIGHT ON
STEADY ON SW
WIDE ON SW
BEEP
BACK LIGHT SW
REC LP SW
S/S MODE SW
RMC OFF SW
VTR MODE SW
DATE SW
TIME SW
KEY A02
STRCS IN
0 ZOOM
Q314 BUFFER
Q305 LED DRIVER
Q309, 310 LED DRIVER
Q315, 316 +5V SW
Q307 +5V SW
Q311 SW
S501 PANEL OPEN
S480 DATE (+)
S481 TIME (NEXT)
S482 COUNTER RESET
S485 START/STOP MODEL
S302 DISPLAY
S301 TITLE
S305 COMMANDER
S488 BUZZER
S484 BACK LIGHT
S483 REC MODE
S300 0 ZOOM
S486 STEADY WIDE
S304 LCD BACK LIGHT
BRIGHT NORMAL
TRV22/212 MODEL
TRV12:E. Hong Kong, Tourist/ TRV12E/12PK MODEL
TRV12/12E/12PK/22/112/212 MODEL
CN480
CN481
CN300
CN304
CN306
CN501
CN302
CN301
J480
LANC
FL300
D322
D332
D333
RV301 VOLUME
SPEAKER
J481 HEADPHONE
TO/FROM SYSCON BLOCK <SEE PAGE 1-9>
TO/FROM CAMERA BLOCK <SEE PAGE 1-6>
TO/FROM VIDEO BLOCK <SEE PAGE 1-8>
TO EVF BLOCK <SEE PAGE 1-17, 19>
TO/FROM LCD/EVF BLOCK <SEE PAGE 1-17, 19>
TO POWER BLOCK <SEE PAGE 1-21>
FROM AUDIO BLOCK <SEE PAGE 1-8>

1-7. LCD/EVF BLOCK DIAGRAM (TYPE A)

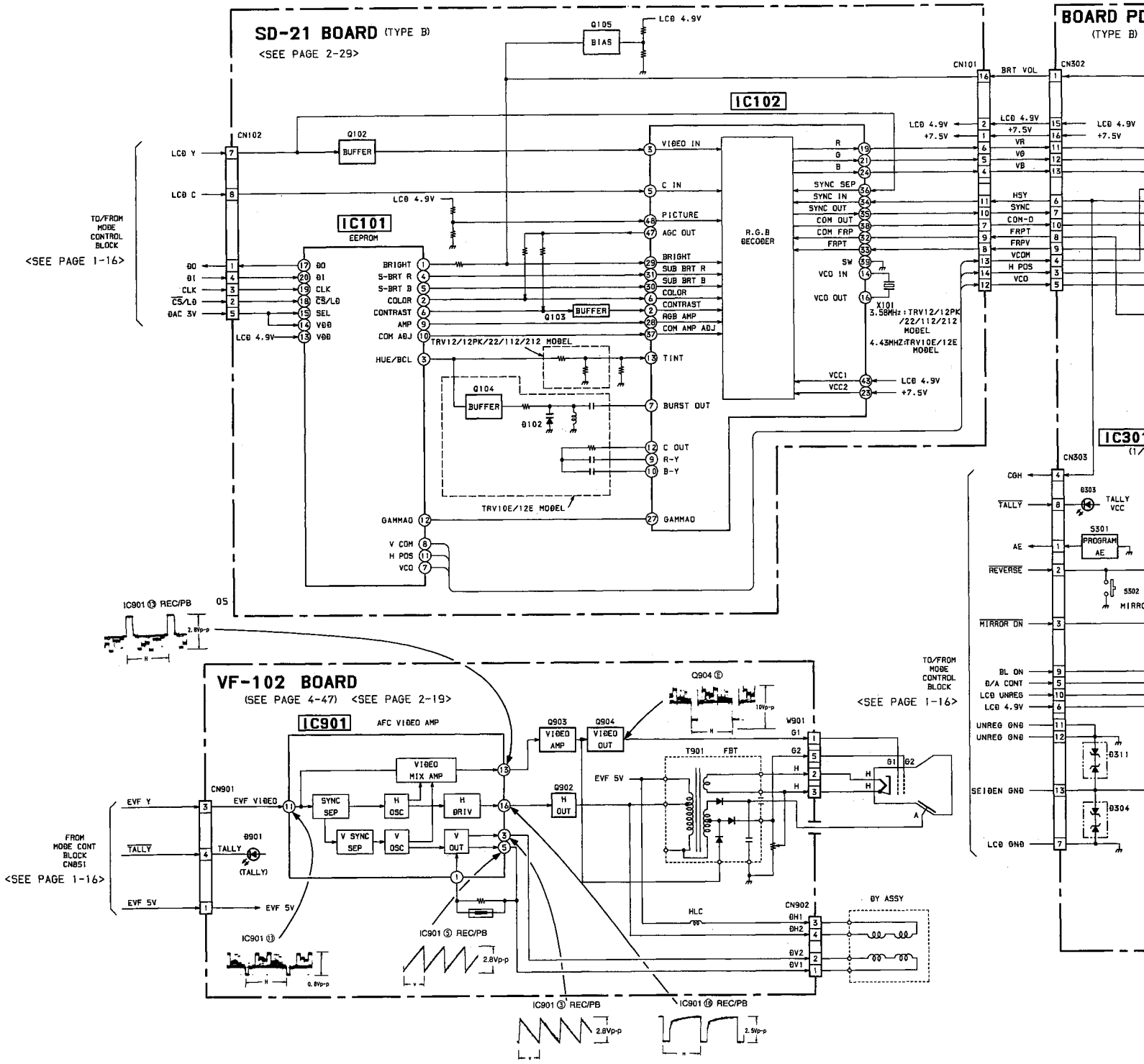


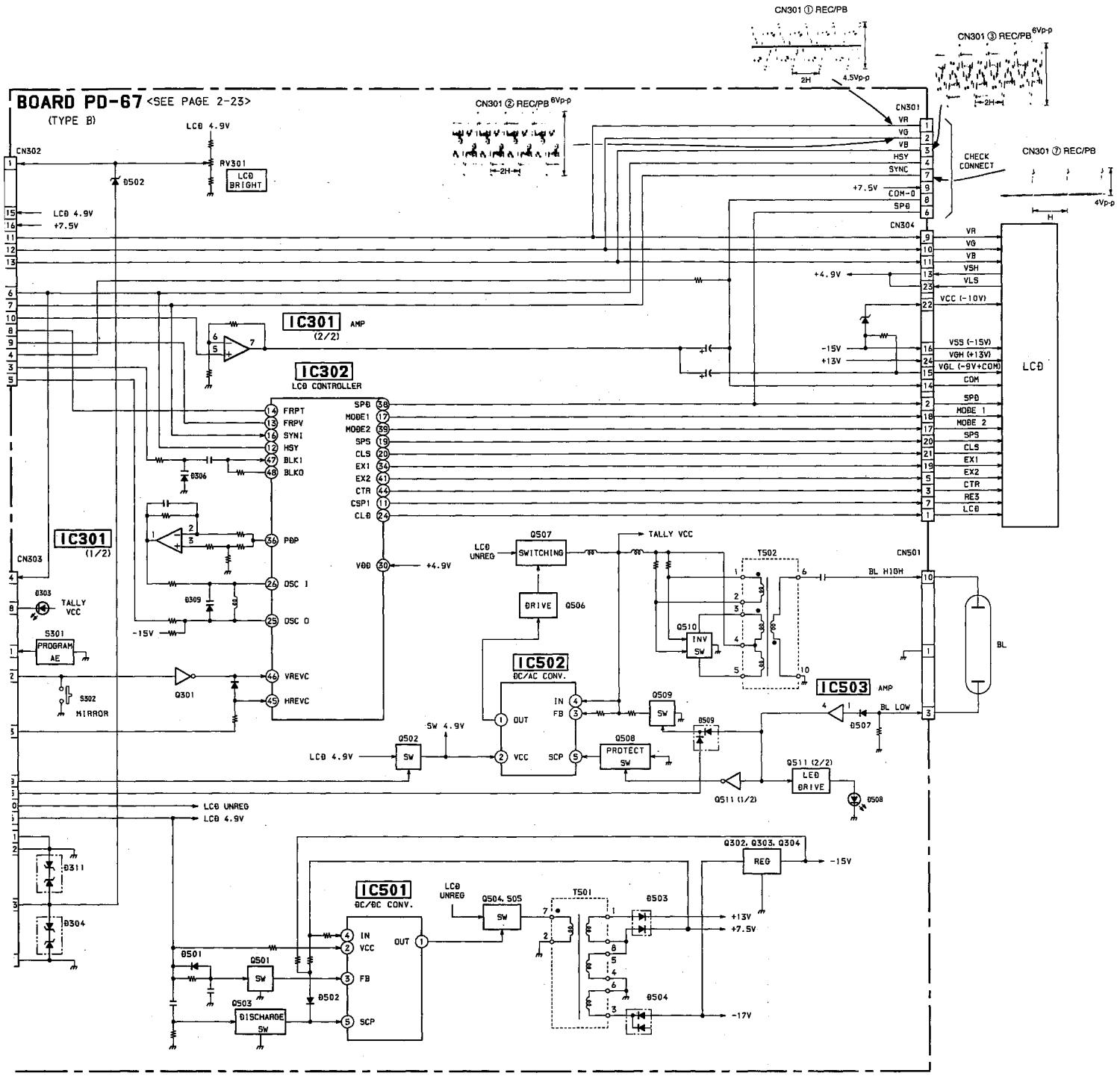


TO/F MO CON' BL(
<SEE PAGE 1-

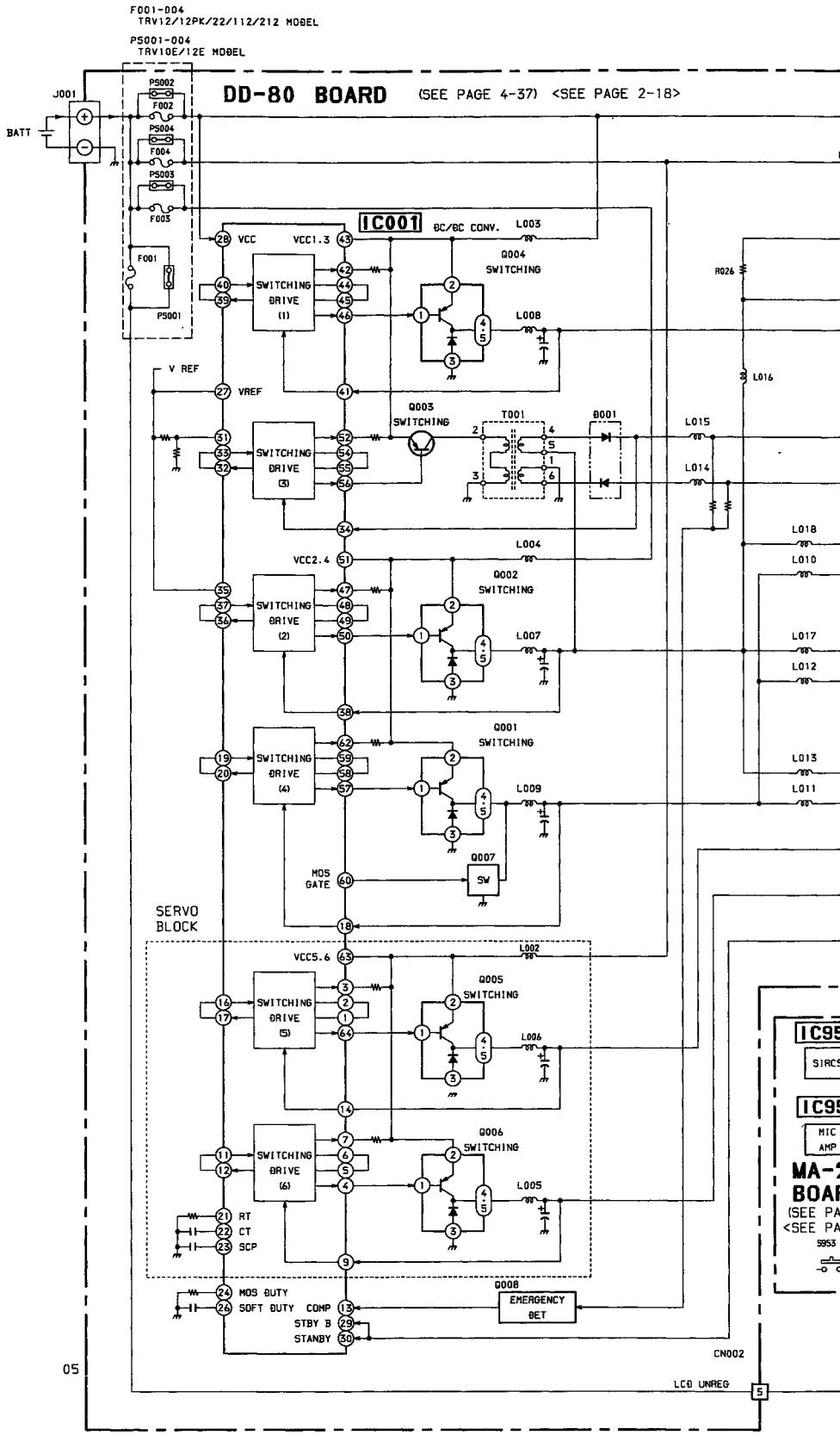
FROM MODE CONT BLOCK CN851
<SEE PAGE 1-16>

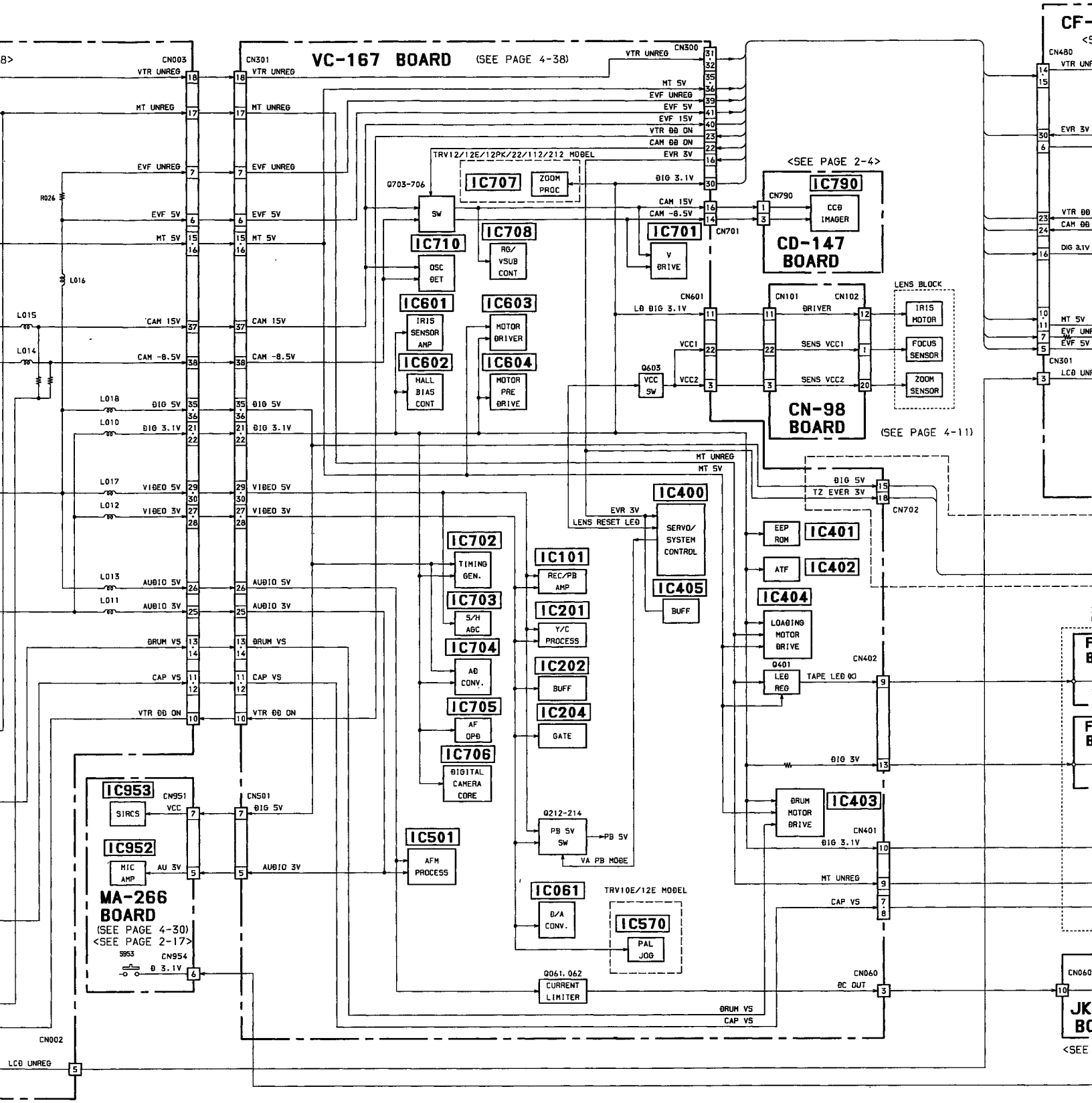
LCD/EVF BLOCK DIAGRAM (TYPE B)

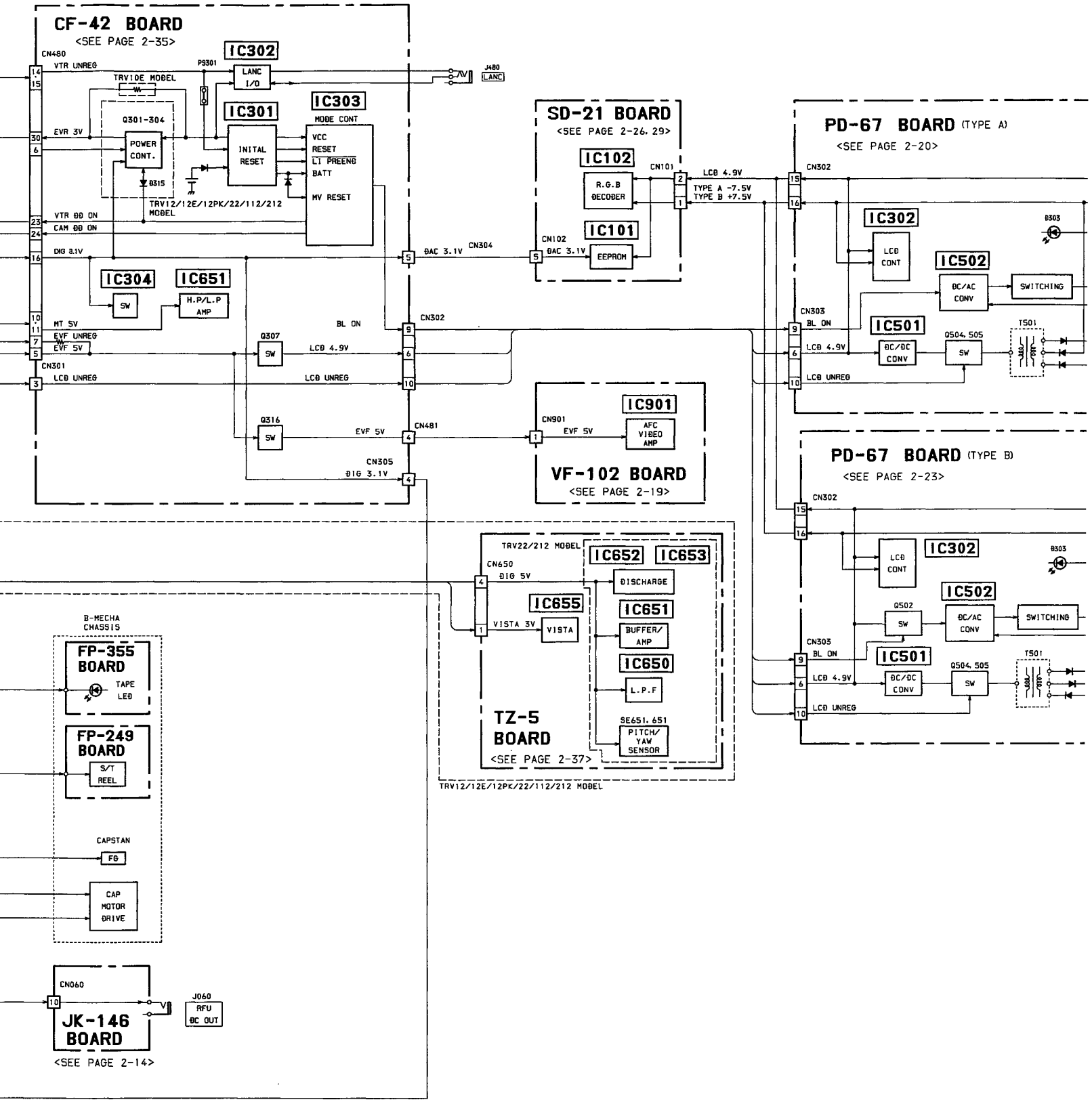


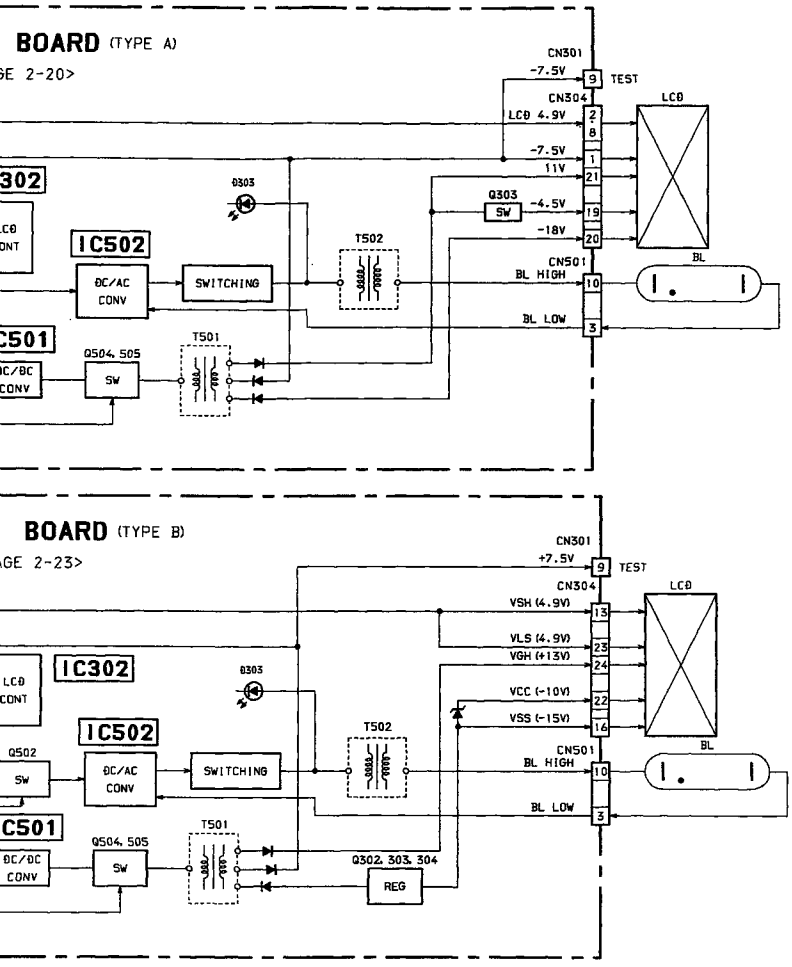

BOARD PD-67 <SEE PAGE 2-23>
(TYPE B)
CN301 ① REC/PB
CN301 ② REC/PB 6Vp-p
CN301 ③ REC/PB 6Vp-p
CN301 ⑦ REC/PB
4.5Vp-p
4Vp-p
2H
CHECK CONNECT
CN501
CN302
CN303
CN304
RV301
LCD BRIGHT
LCD 4.9V
+7.5V
+4.9V
-15V
+13V
VCC (-10V)
VSS (-15V)
VGH (+13V)
VGL (-9V+COM)
COM
LCD
IC301 AMP (2/2)
IC301 (1/2)
IC302 LCD CONTROLLER
FRPT
FRPV
SYNI
HSY
BLKI
BLKO
PBP
OSC I
OSC O
VREVC
HREVC
SPD
MODE1
MODE2
SPS
CLS
EX1
EX2
CTR
CSP1
CLD
VDD
Q301
Q302, Q303, Q304 REG
Q501 SW
Q502 SW
Q503 DISCHARGE SW
Q504, Q505 SW
Q506 DRIVE
Q507 SWITCHING
Q508 PROTECT SW
Q509 SW
Q510 INV SW
Q511 (1/2)
Q511 (2/2) LED DRIVE
IC501 DC/DC CONV.
IC502 DC/AC CONV.
IC503 AMP
T501
T502
TALLY VCC
LCD UNREG
SW 4.9V
BL HIGH
BL LOW
BL
PROGRAM AE
MIRROR
D303
D304
D306
D309
D311
D501
D502
D503
D504
D507
D508
D509

1-9. POWER BLOCK DIAGRAM




VC-167 BOARD
(SEE PAGE 4-38)
CN003
CN301
CN300
VTR UNREG
MT UNREG
EVF UNREG
EVF 5V
MT 5V
CAM 15V
CAM -8.5V
DIG 5V
DIG 3.1V
VIDEO 5V
VIDEO 3V
AUDIO 5V
AUDIO 3V
DRUM VS
CAP VS
VTR DD ON
MT 5V
EVF 15V
VTR DD ON
CAM DD ON
EVR 3V
TRV12/12E/12PK/22/112/212 MODEL
IC707
ZOOM PROC
Q703-706
SW
IC710
OSC DET
IC708
RG/ VSUB CONT
IC601
IRIS SENSOR AMP
IC602
HALL BIAS CONT
IC603
MOTOR DRIVER
IC604
MOTOR PRE DRIVE
<SEE PAGE 2-4>
IC790
CCD IMAGER
CD-147 BOARD
IC701
V DRIVE
CN790
CN701
CN601
LCD DIG 3.1V
VCC1
VCC2
Q603
VCC SW
CN101
CN102
DRIVER
SENS VCC1
SENS VCC2
LENS BLOCK
IRIS MOTOR
FOCUS SENSOR
ZOOM SENSOR
CN-98 BOARD
(SEE PAGE 4-11)
IC400
SERVO/ SYSTEM CONTROL
EVR 3V
LENS RESET LCD
IC405
BUFF
IC401
EEP ROM
IC402
ATF
IC404
LOADING MOTOR DRIVE
Q401
LCD REG
TAPE LED (C)
CN402
CN702
TZ EVER 3V
IC702
TIMING GEN.
IC703
S/H AGC
IC704
AD CONV.
IC705
AF OPD
IC706
DIGITAL CAMERA CORE
IC101
REC/PB AMP
IC201
Y/C PROCESS
IC202
BUFF
IC204
GATE
Q212-214
PB 5V SW
PB 5V
VA PB MODE
IC501
AFM PROCESS
IC403
DRUM MOTOR DRIVE
CN401
IC061
D/A CONV.
TRV10E/12E MODEL
IC570
PAL JOG
Q061, 062
CURRENT LIMITER
CN060
DC OUT
IC953
SIRCS
CN951
VCC
IC952
MIC AMP
AU 3V
MA-266 BOARD
(SEE PAGE 4-30)
<SEE PAGE 2-17>
S953
CN954
D 3.1V
CN501
CN002
LCD UNREG
CN480
CN301
R026
L016
L015
L014
L018
L010
L017
L012
L013
L011


CF-42 BOARD
<SEE PAGE 2-35>
CN480
VTR UNREG
TRVIDE MODEL
Q301-304
EVR 3V
POWER CONT.
D315
TRV12/12E/12PK/22/112/212 MODEL
VTR DD ON
CAM DD ON
DIG 3.1V
IC302
LANC I/O
PS301
J480
LANC
IC301
INITAL RESET
IC303
MODE CONT
VCC
RESET
LI PREENG
BATT
MV RESET
IC304
SW
IC651
H.P/L.P AMP
MT 5V
EVF UNREG
EVF 5V
CN301
LCD UNREG
Q307
SW
BL ON
LCD 4.9V
Q316
SW
EVF 5V
CN481
CN305
DIG 3.1V
CN304
DAC 3.1V
CN302
SD-21 BOARD
<SEE PAGE 2-26, 29>
IC102
R.G.B DECODER
CN101
LCD 4.9V
TYPE A -7.5V
TYPE B +7.5V
IC101
EEPROM
CN102
DAC 3.1V
PD-67 BOARD (TYPE A)
<SEE PAGE 2-20>
CN302
IC302
LCD CONT
D303
IC502
DC/AC CONV
SWITCHING
CN303
BL ON
IC501
DC/DC CONV
Q504, 505
SW
T501
LCD 4.9V
LCD UNREG
VF-102 BOARD
<SEE PAGE 2-19>
IC901
CN901
EVF 5V
AFC VIDEO AMP
PD-67 BOARD (TYPE B)
<SEE PAGE 2-23>
CN302
IC302
LCD CONT
D303
IC502
Q502
SW
DC/AC CONV
SWITCHING
CN303
BL ON
IC501
DC/DC CONV
Q504, 505
SW
T501
LCD 4.9V
LCD UNREG
TRV22/212 MODEL
CN650
DIG 5V
IC652
IC653
DISCHARGE
IC655
VISTA 3V
VISTA
IC651
BUFFER/ AMP
IC650
L.P.F
SE651, 651
PITCH/ YAW SENSOR
TZ-5 BOARD
<SEE PAGE 2-37>
TRV12/12E/12PK/22/112/212 MODEL
B-MECHA CHASSIS
FP-355 BOARD
TAPE LED
FP-249 BOARD
S/T REEL
CAPSTAN
FG
CAP MOTOR DRIVE
CN060
J060
RFU DC OUT
JK-146 BOARD
<SEE PAGE 2-14>


BOARD (TYPE A)
GE 2-20>
CN301
-7.5V
9
TEST
CN304
LCD 4.9V
2
8
-7.5V
1
11V
21
-4.5V
19
-18V
20
LCD
Q303
SW
Q303
IC302
IC502
DC/AC CONV
SWITCHING
T502
CN501
BL HIGH
10
BL LOW
3
BL
C501
DC/DC CONV
Q504, 505
SW
T501

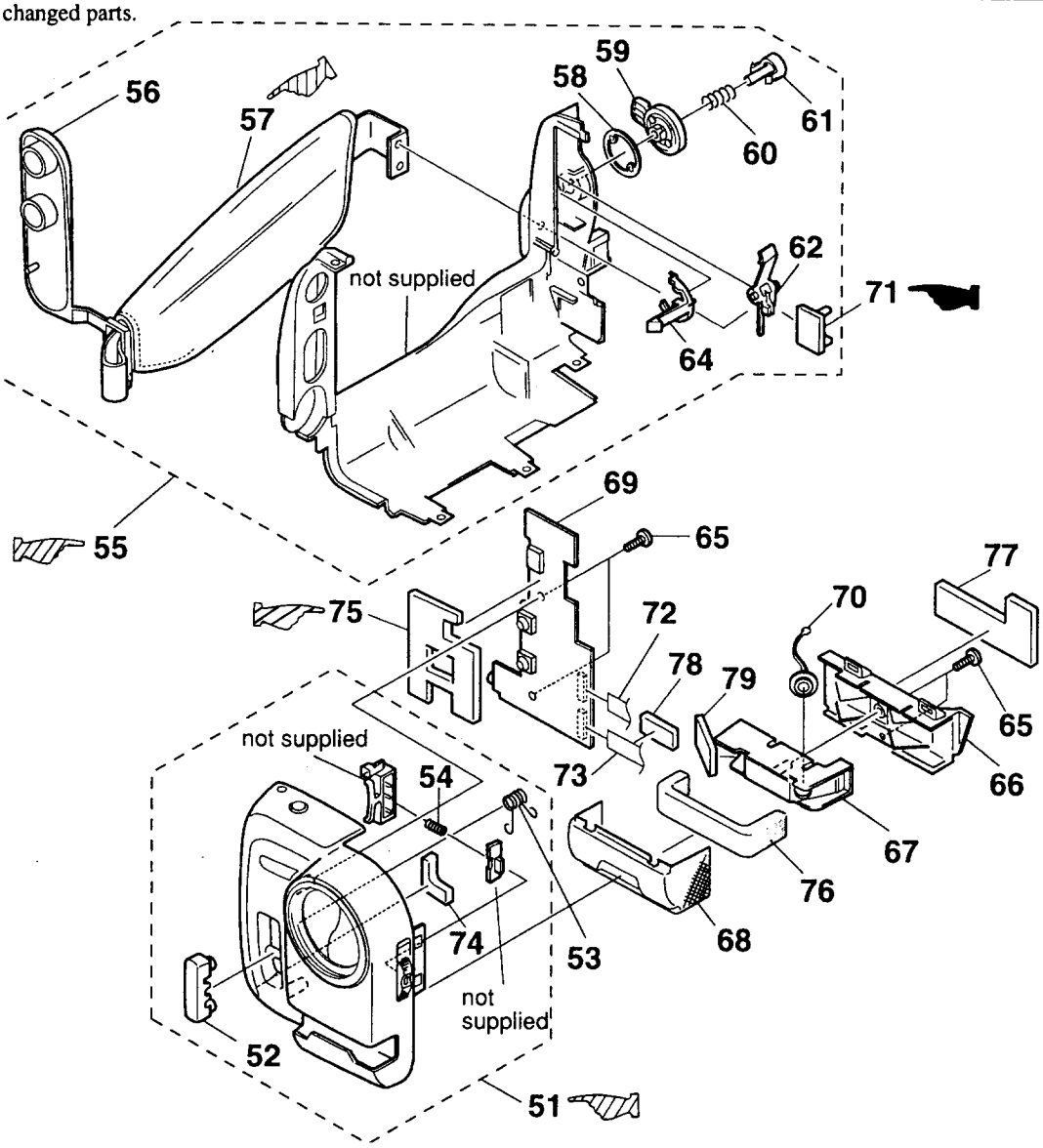
BOARD (TYPE B)
AGE 2-23>
CN301
+7.5V
9
TEST
CN304
VSH (4.9V)
13
VLS (4.9V)
23
VGH (+13V)
24
VCC (-10V)
22
VSS (-15V)
14
LCD
Q303
IC302
IC502
Q502
SW
DC/AC CONV
SWITCHING
T502
CN501
BL HIGH
10
BL LOW
3
BL
C501
DC/DC CONV
Q504, 505
SW
T501
Q302, 303, 304
REG

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.
Les composants identifiés par une marque ⚠ sont critiquens pour la sécurité. Ne les remplacer que par une pièce portant le neméro spécifié.

3-1-1. CABINET (L), F PANEL SECTION (SEE PAGE 5-2)

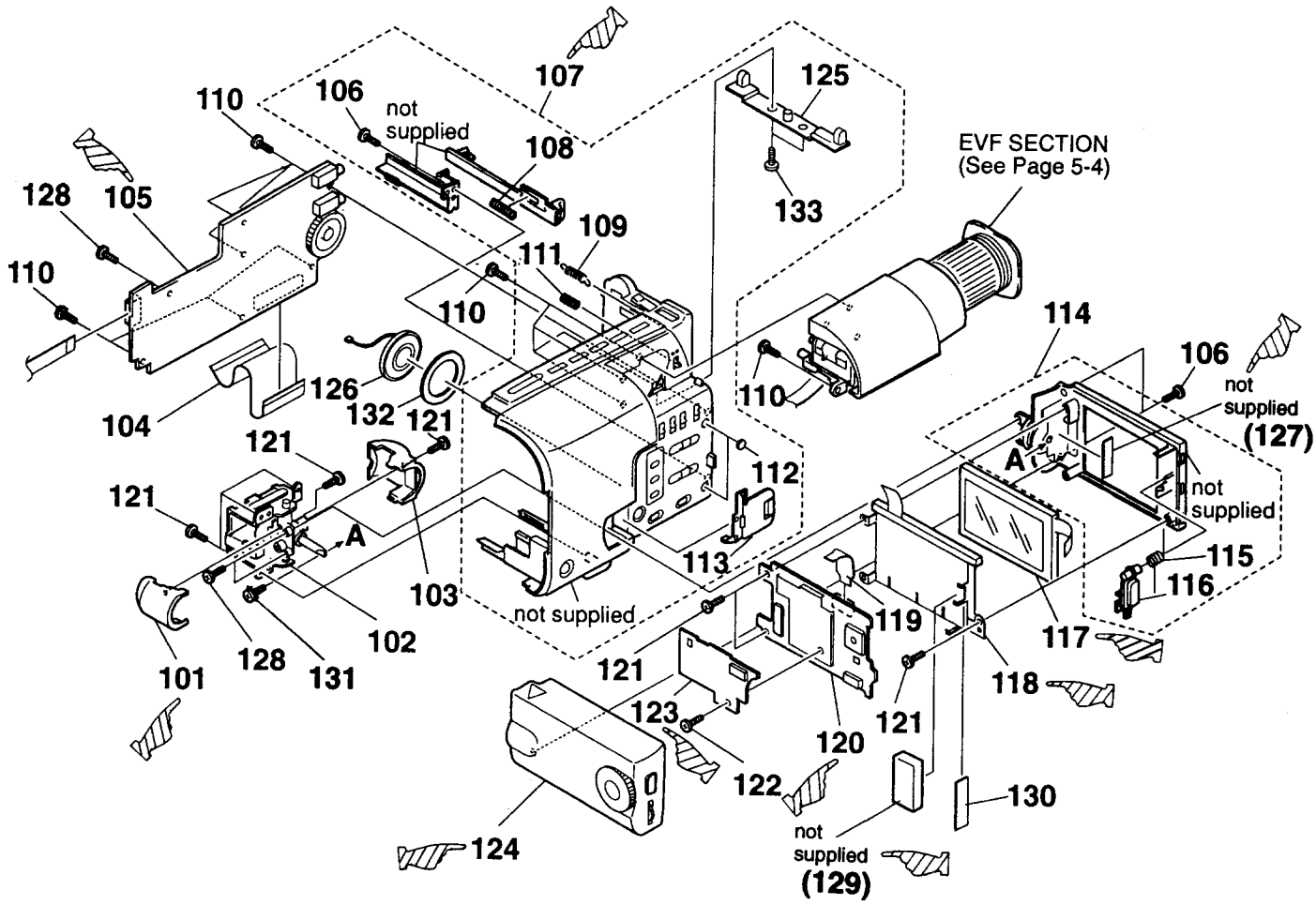
:Points deleted parts.

:Points changed parts.



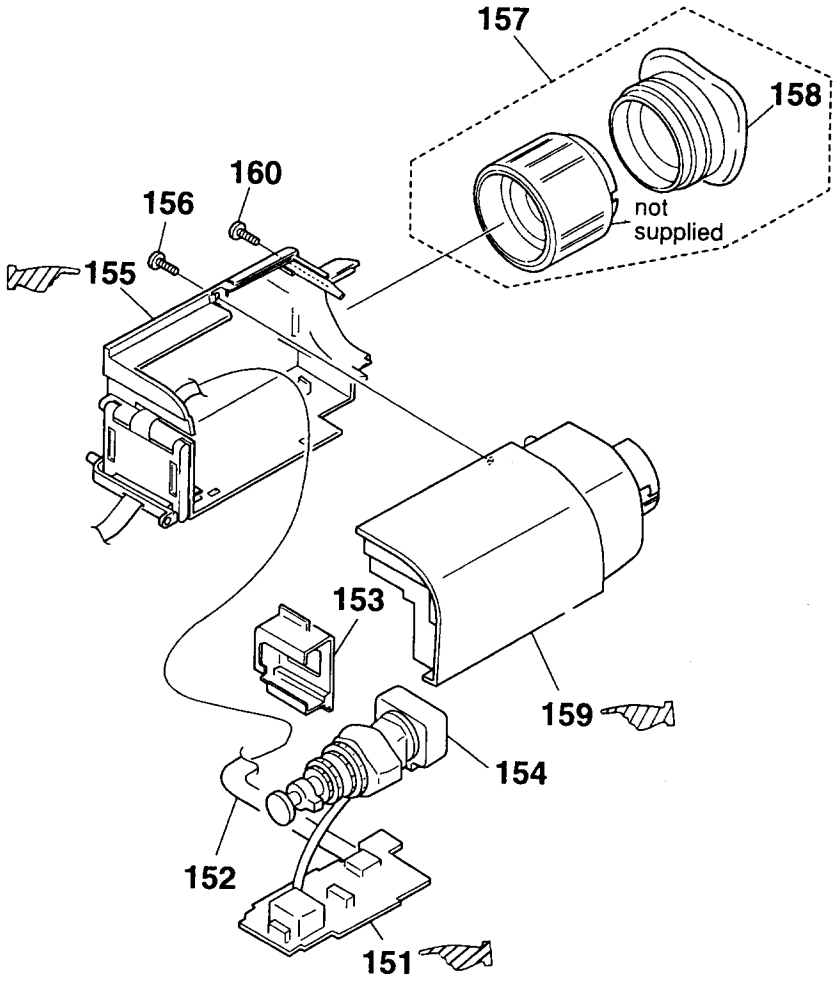
3-1-2. CABINET (R) SECTION (SEE PAGE 5-3)

: Points changed parts.



3-1-3. EVF SECTION (SEE PAGE 5-4)

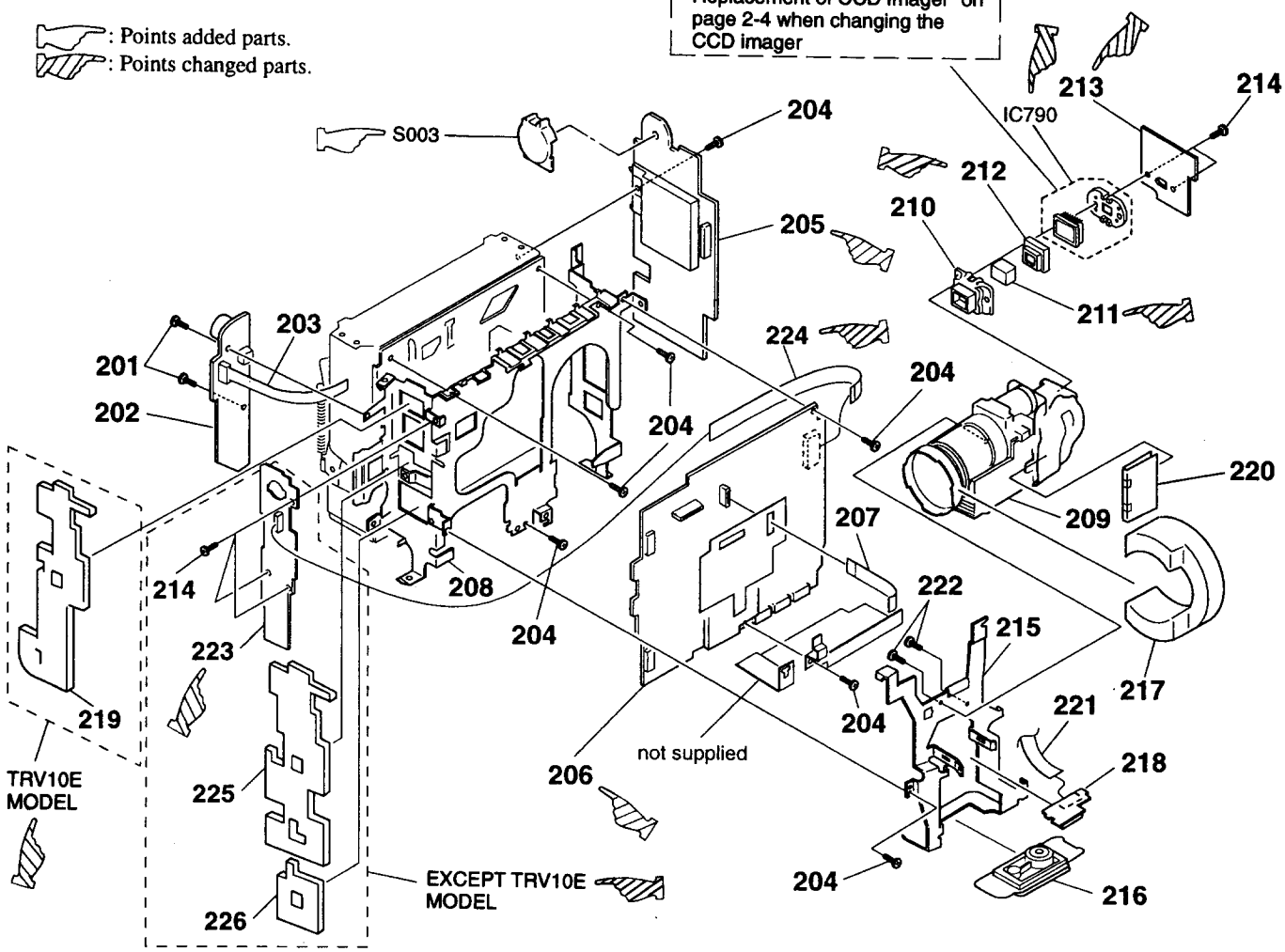
: Points changed parts.



3-1-4. MAIN SECTION (SEE PAGE 5-5)

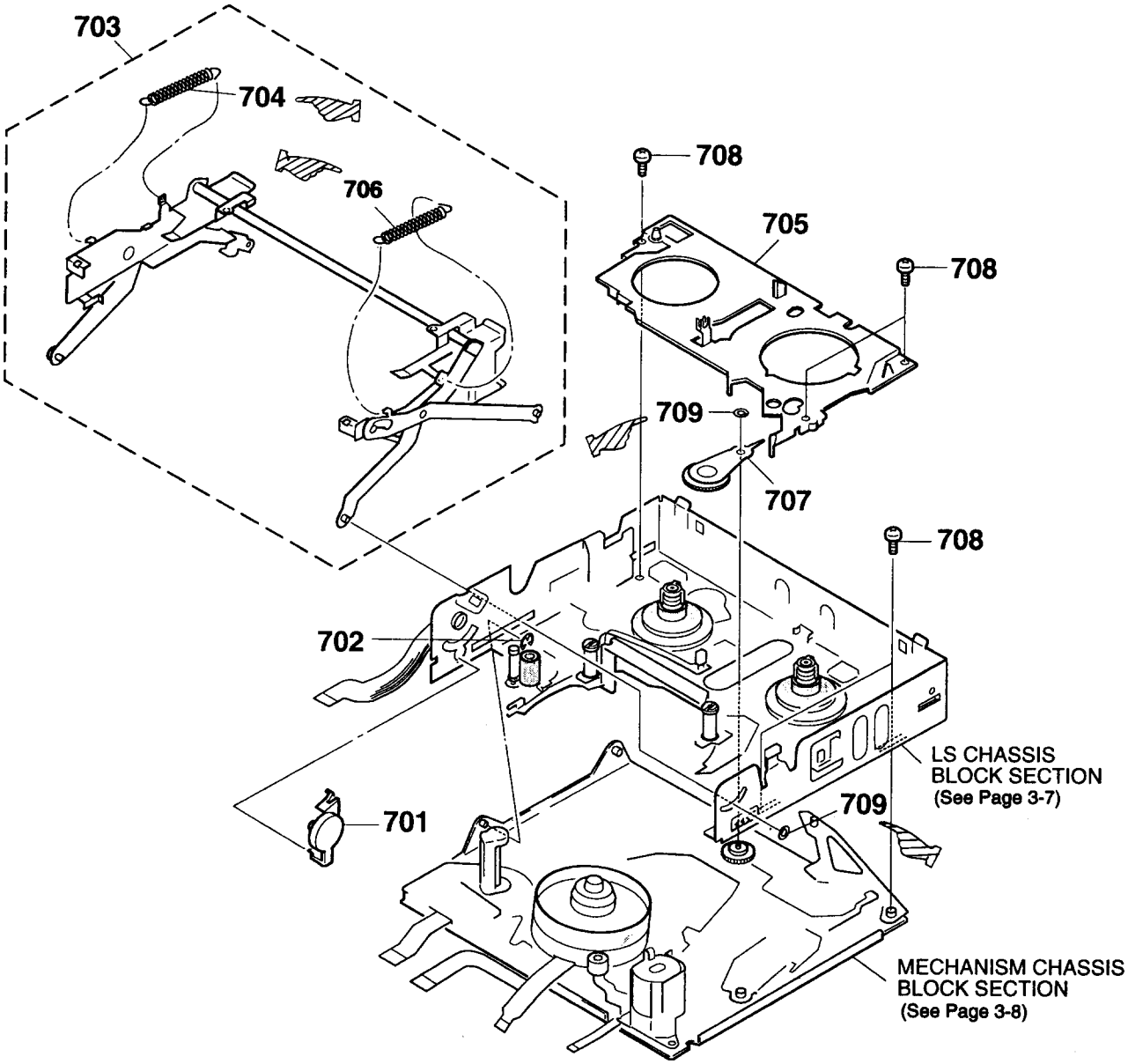
: Points added parts.
: Points changed parts.

* Be sure to read "Precautions for Replacement of CCD Imager" on page 2-4 when changing the CCD imager



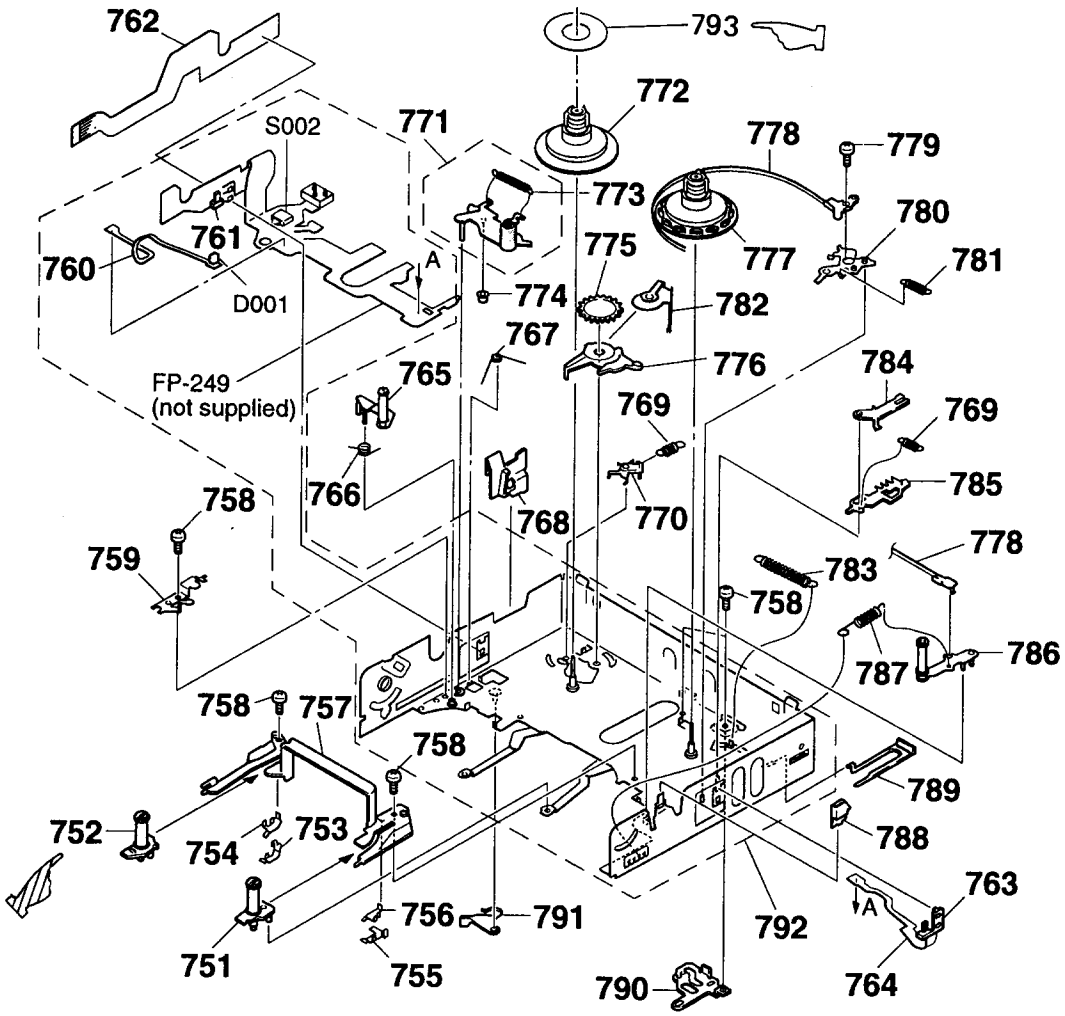
3-1-5. CASSETTE COMPARTMENT BLOCK SECTION (SEE PAGE 5-6)

:Points changed parts.



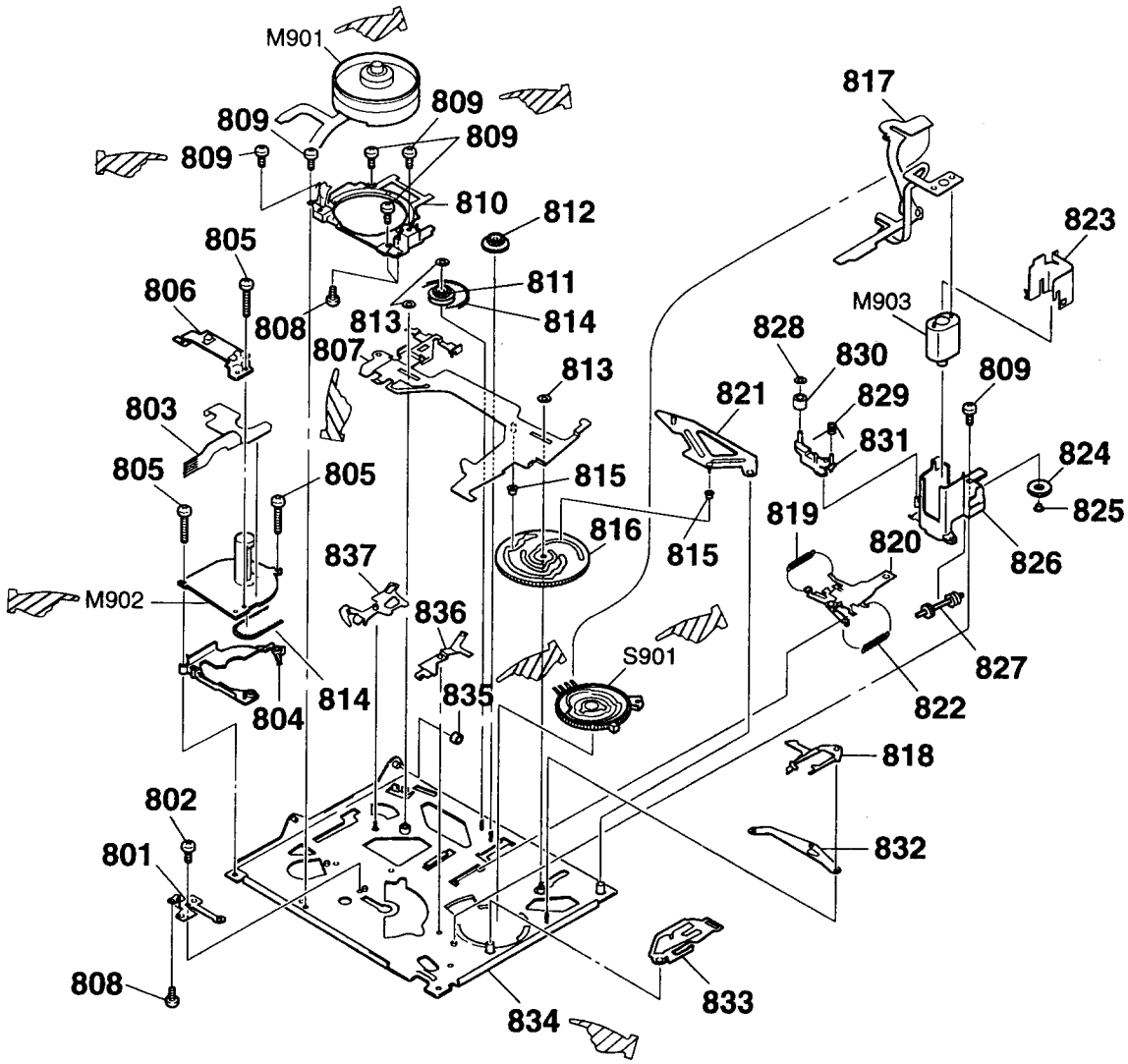
3-1-6. LS CHASSIS BLOCK SECTION (SEE PAGE 5-7)

: Points added parts.
: Points changed parts.



3-1-7. MACHANISM CHASSIS BLOCK SECTION (SEE PAGE 5-8)

: Points changed parts.



SECTION 4
ADJUSTMENTS

4-1. CAMERA SECTION ADJUSTMENT

• 2.5 inch LCD information

There are 2 kinds of TYPE A and TYPE B. Identify either TYPE A or B from the suffix of the board. However, PC board without parts (no mount) is not supplied.

BOARD	TYPE A	TYPE B
PD-67	1-660-424-13	1-660-424-22
SD-21	1-660-425-12	1-660-425-22

NTSC model: CCD-TRV12/TRV12PK/TRV22/TRV112/TRV212
PAL model: CCD-TRV10E/TRV12E

4-1-1. CAMERA SYSTEM ADJUSTMENT

1-1. LCD system adjustments (PD-67 board)

Note 1: The backlight (fluorescent lamp is driven by high voltage AC power supply.
Therefore, be careful not to touch the back light holder with hand or you will receive an electric shock.

Note 2: When replacing the LCD unit, be careful not to damage the LCD unit with static electricity.

Note 3: Set the BRIGHT knob to the center click position.

[Adjustment connector]

Most measurement points of the LCD adjustment are concentrated at the CN301 of the PD-67 board. Connect the measuring equipment to CN301 via the measuring pin tool. The following table shows the pin numbers and signal names of CN301.

CN301 (TYPE A)

Pin No.	Signal Name	Pin No.	Signal Name
1	VR	2	VG
3	VB	4	HDB
5	GND	6	SRT
7	SYNC	8	N. C.
9	–7.5 V		

CN301 (TYPE B)

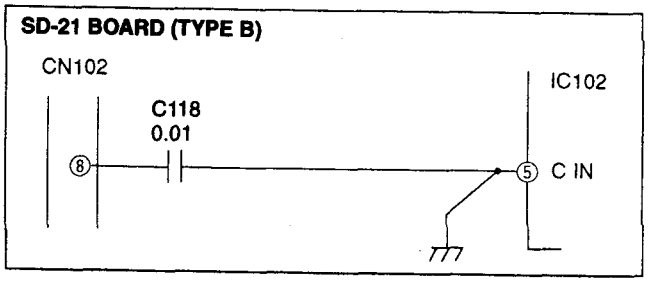
Pin No.	Signal Name	Pin No.	Signal Name
1	VR	2	VG
3	VB	4	HSY
5	GND	6	SPD
7	H-SYNC	8	COM-O
9	+7.5V		

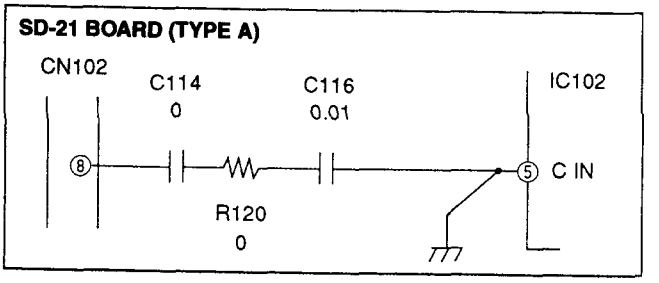
1. Multi CPC Parts code:J-6082-311-A

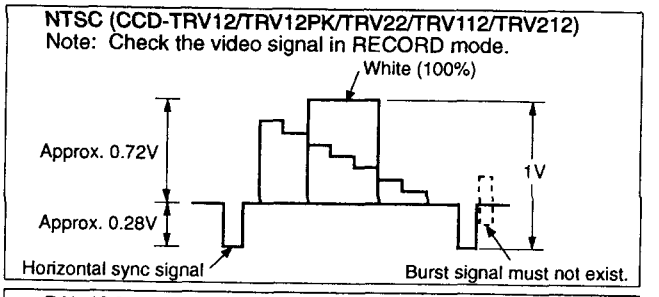
2. Alignment tape
NTSC (CCD-TRV12/TRV12PK/TRV22/TRV112/TRV212):
WR5-4NL (8-967-995-51)
PAL (CCD-TRV10E/TRV12E):
WR5-4CL (8-967-995-56)

[Video input signal for adjustment]

Playback an alignment tape. Use the color bar signal of the alignment tape playback as the input signal to this machine. Then check that the white (100%) signal amplitude at CN102 pin ⑦ on the SD -21 board is 1.00 Vp-p. If the signal column specifies the "Color bar signal with the chroma and burst signals turned OFF", remove the capacitor C114: TYPE A/C118: TYPE B on the SD-21 board, and connect the IC102 pin ⑤ to GND. Return C114: TYPE A/ C118: TYPE B and IC102 pin ⑤ to the original connections upon completion of adjustment.







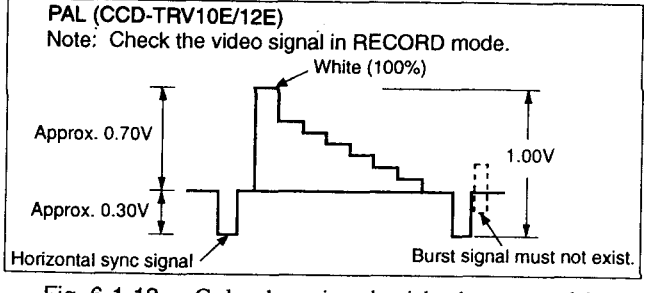


Fig. 6-1-13 Color bar signal with chroma and burst signals switched OFF.

[Power supply voltage adjustment]

Adjust the power supply voltage to be input to the battery terminal so that the voltage across PD-67 board CN303 pins ⑩ (LCD UNREG) and pins ⑪ or ⑫ (UNREG GND) is 6.5 ± 0.1Vdc.

Power supply voltage check (PD-67, SD-21 boards)

Subject	Any subject
Measuring equipment	Digital voltmeter
DAC 3.1V check	
Measurement point	CN102 Pin ⑤ (SD-21)
Specification	3.1±0.1Vdc (GND : CN102 Pin ⑥)
LCD 4.9V check	
Measurement point	CN303 Pin ⑥ (PD-67)
Specification	4.8±0.05Vdc (GND : CN303 Pin ⑦)
LCD UNREG check	
Measurement point	CN303 Pin ⑩ (PD-67)
Specification	6.5±0.1Vdc (GND : CN303 Pin⑪ or ⑫)

1-1. EVR initial data input

Mode	Stop
Signal	Any signal
Adjustment page	F

Note : Do not rewrite the EE PROM data except when it is necessary such as replacement of SD-21 board IC101.

Adjustment procedure:

• TYPE A

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	D8	C0	
		D9	(B0) [60]	
		DA	(6A) [7A]	
		DB	80	
		DC	80	
		DD	(A0)[AA]	After setting the data,
		DE	90 [8A]	press the PAUSE button.
		DF	(C0) [BA]	
		E0	80	
		E1	80	
		E2	(8A) [90]	
		E3	50	
3	6	00	00	After setting the data, press the PAUSE button. (End)

No mark: NTSC/PAL
( ) : NTSC
[ ] : PAL

• TYPE B

Order	Page	Address	Data	Procedure
1	6	00	01	
2	F	D8	80	
		D9	(9A) [7A]	
		DA	(8A) [5A]	
		DB	60	
		DC	6A	
		DD	A0	
		DE	(8A)[80]	
		DF	30	
		E0	6A	
		E1	2A	
		E2	(4A) [60]	
		E3	65	
3	6	00	00	

No mark: NTSC/PAL
( ) : NTSC
[ ] : PAL

1-2. –7.5 V adjustment (TYPE A Only)

Mode	Stop
Signal	No signal
Measurement point	PD-67 board CN301 pin ⑨ (–7.5V)
Measuring equipment	Digital voltmeter
Adjustment page	F
Adjustment address	E3
Specification	A=–7.5±0.1Vdc

Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	E3		Change data using the PLAY and STOP buttons so that the voltage goes to the specification value.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

1-3. VCO adjustment

Purpose: Sets the VCO free-run frequency.

Adjustment Error: Incorrect picture on EVF

Mode	Stop
Signal	No signal
Measurement point	PD-67 board CN301 pin ④ (HDB: TYPE A) (HSY: TYPE B)
Measuring equipment	Frequency counter
Adjustment page	F
Adjustment address	DE
Specification	NTSC: f=15734±30 Hz PAL: f=15625±30 Hz

Adjustment procedure:

Order	page	Address	Data	Procedure
1				Remove C108 (10 µF capacitor) (SD-21 board): TYPE A Remove C107 (1 µF capacitor) (SD-21 board): TYPE B
2				Press the DATA SCREEN button of the remote commander to disappear the display.
3	6	00	01	After setting the data, press the PAUSE button. (Preparation)
4	F	DE		Change data using the PLAY and STOP buttons until the oscillating frequency satisfies the specification.
5				Press the PAUSE button.
6	6	00	00	After setting the data, press the PAUSE button. (End)
7				Connect C108 (10 µF capacitor) (SD-21 board): TYPE A Connect C107 (1 µF capacitor) (SD-21 board): TYPE B

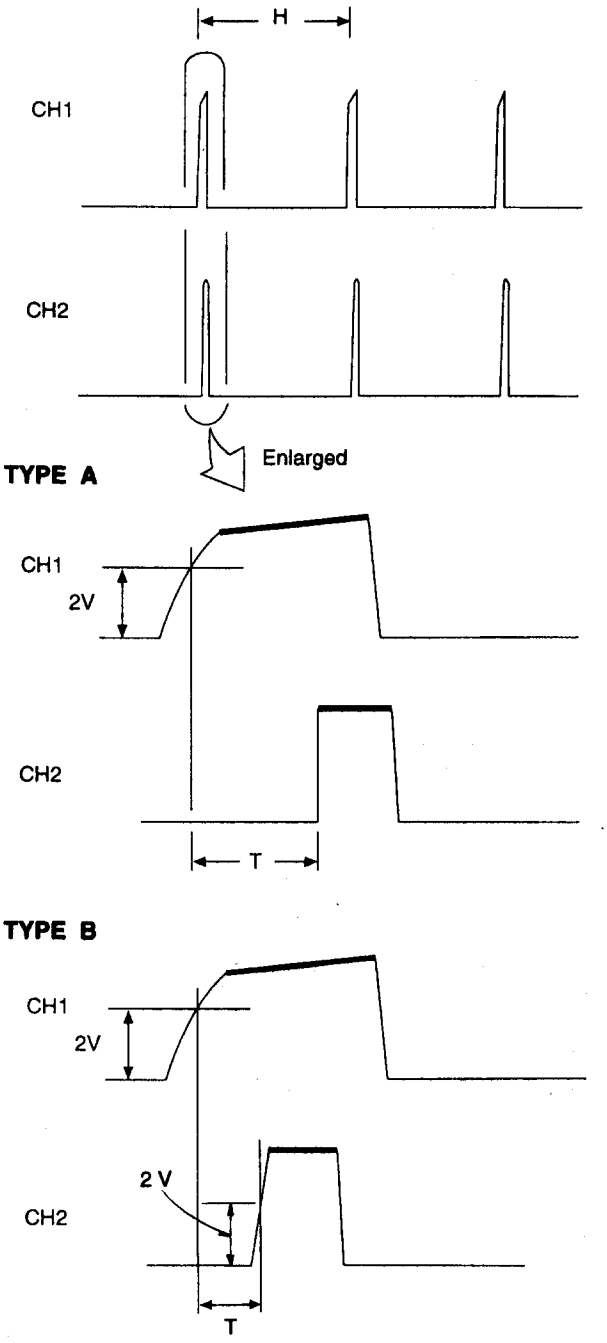
1-4. Horizontal display position adjustment

Purpose: Adjust the horizontal position of picture on LCD display.

Adjustment Error: Picture position will be shifted left or right.

Mode	Stop
Signal	Color bar signal
Measurement point	CH1: PD-67 board CN301 pin ⑦ (SYNC) CH2: PD-67 boad CN301 pin ⑥ (SRT: TYPE A) (SPD: TYPE B)
Measuring equipment	Oscilloscope
Adjustment page	F
Adjustment address	E2
Specification	TYPE A (NTSC): T=1.10±0.10μsec (PAL): T=0.60±0.10μsec TYPE B (NTSC): T=0.90±0.10μsec (PAL): T=1.90±0.10μsec

Note: Set the LCD so that it is directed toward the lens.
(The waveform is different depending upon direction.)



Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	E2		Change data using the PLAY and STOP button until the delay time "T" satisfies the specification.
3				After setting the data, press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

1-5. D RANGE adjustment (TYPE B only)

Purpose : Adjust to the proper LCD panel driving dynamic range.

Adjustment Error : Image will be saturated (whitish) or blackish.

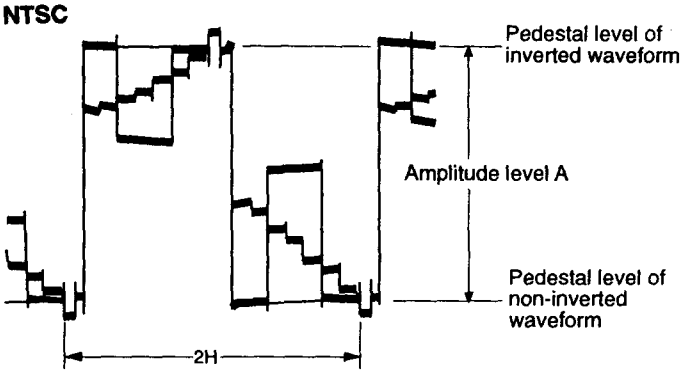
Mode	Playback
Signal	Color bar signal with chroma and burst signal switched OFF.
Measurement point	PD-67 board CN301 pin ② (VG)
Measuring instrument	Oscilloscope External trigger: CN301 Pin ④
Adjustment page	F
Adjustment address	E0
Specified value	NTSC: A=3.65±0.05 Vp-p PAL: A=3.70±0.05 Vp-p

Note : Check that the BRIGHT Knob is set to the center click position.

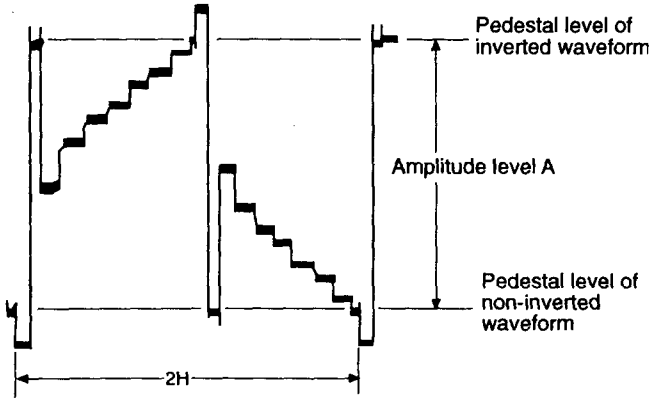
Adjustment procedure :

Oder	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	E0		Change the data of page : F address : E0, and adjust the amplitude level (A) of the VG signal to the specified value. Amplitude : Level difference between the reverse waveform pedestal and non-reversed waveform pedestal.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

NTSC



PAL



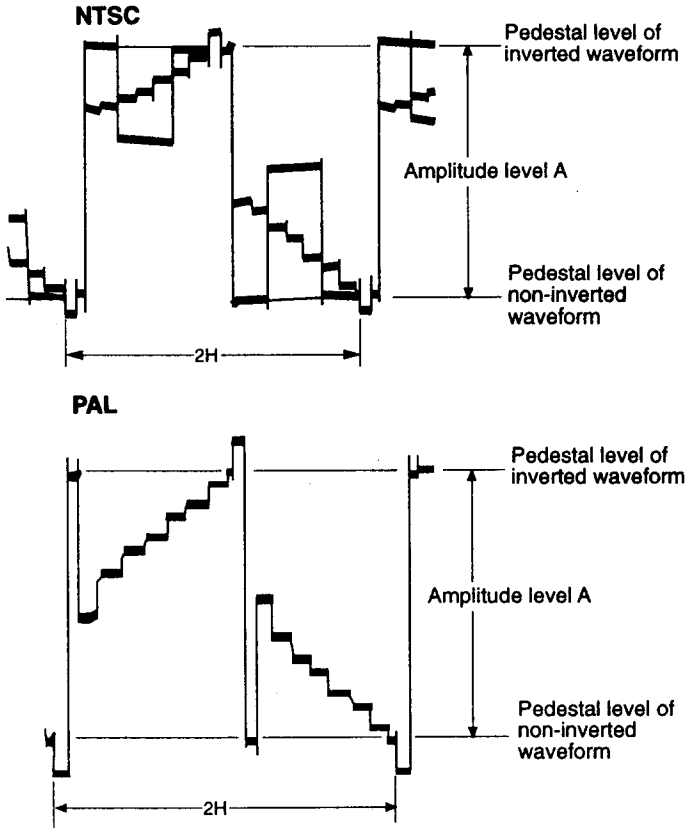
1-6-1. BRIGHT adjustment (TYPE A)

Purpose: Adjusts video signal level to drive the LCD panel.

Adjustment Error: Picture on LCD will be white saturated or black compressed.

Mode	Playback
Signal	Color bar signal with the chroma and burst signal switched OFF.
Measurement point	PD-67 board CN301 pin ② (VG)
Measuring equipment	Oscilloscope [External trigger: CN302 Pin ⑪ (FRP)]
Adjustment page	F
Adjustment address	D8
Specified value	NTSC: A=1.90±0.05 Vp-p PAL: A=1.80±0.05 Vp-p

Note 1: Check that the BRIGHT knob is set to the center click position.



Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	D8		Change data using the PLAY and STOP buttons until the VG signal amplitude (A) has the specification value.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

Note 2: The adjustment data must be within the range from 41. to BF.

Related Adjustment: CONTRAST adjustment

1-6-2. BRIGHT adjustment (TYPE B)

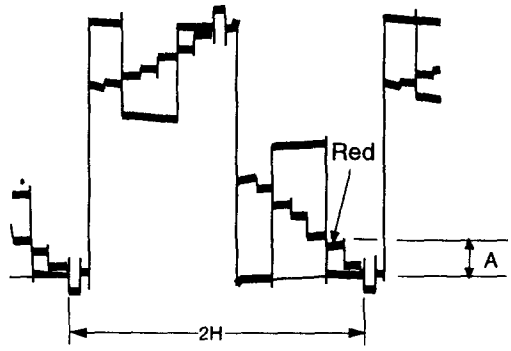
Purpose: Adjusts video signal level to drive the LCD panel.

Adjustment Error: Picture on LCD will be white saturated or black compressed.

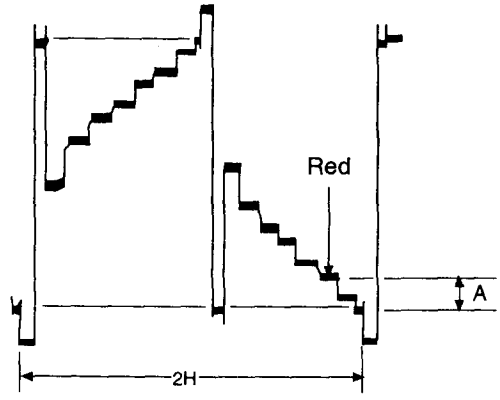
Mode	Playback
Signal	Color bar signal with the chroma and burst signal switched OFF.
Measurement point	PD-67 board CN301 pin ② (VG)
Measuring equipment	Oscilloscope [External trigger: CN302 Pin ④ (HSY)]
Adjustment page	F
Adjustment address	D8
Specified value	NTSC: A=1.20±0.05 Vp-p PAL: A=1.15±0.05 Vp-p

Note: Check that the BRIGHT knob is set to the center click position.

NTSC



PAL



Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	D8		Change data using the PLAY and STOP buttons until the VG signal amplitude (A) has the specification value.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

1-7-1. CONTRAST adjustment (TYPE A)

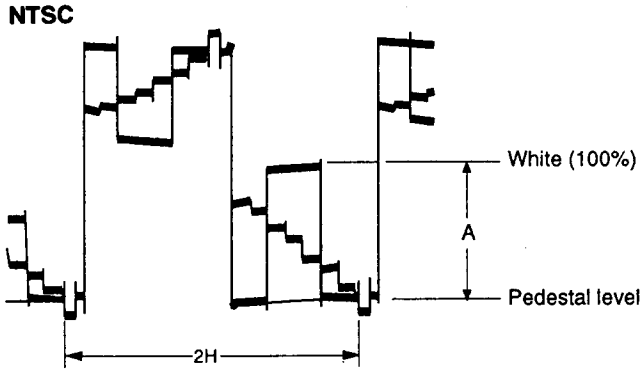
Purpose: Adjusts contrast of LCD picture

Adjustment Error: Details of black will be lost, or white saturated/black compressed picture.

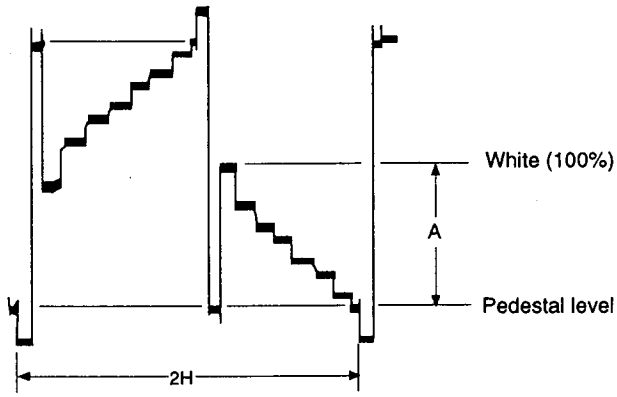
Mode	Playback
Signal	Color bar signal with the chroma and burst signal switched OFF.
Measurement point	PD-67 board CN301 pin ② (VG)
Measuring equipment	Oscilloscope [External trigger: CN302 Pin ⑪ (FRP)]
Adjustment page	F
Adjustment address	DD
Specified value	NTSC: A=2.30±0.05 Vp-p PAL: A=2.20±0.05 Vp-p

Note 1: Check that the BRIGHT knob is set to the center click position.

NTSC



PAL



Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	DD		Change data using the PLAY and STOP buttons until the amplitude (A) has the specification value.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

Note 2: After this adjustment, check BRIGHT of viewfinder.
If it is incorrect, adjust it again.

Related Adjustment: BRIGHT adjustment

1-7-2. CONTRAST adjustment (TYPE B)

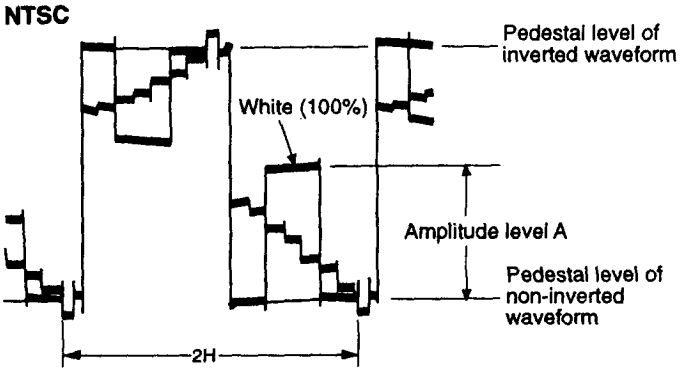
Purpose: Adjusts contrast of LCD picture

Adjustment Error: Details of black will be lost, or white saturated/black compressed picture.

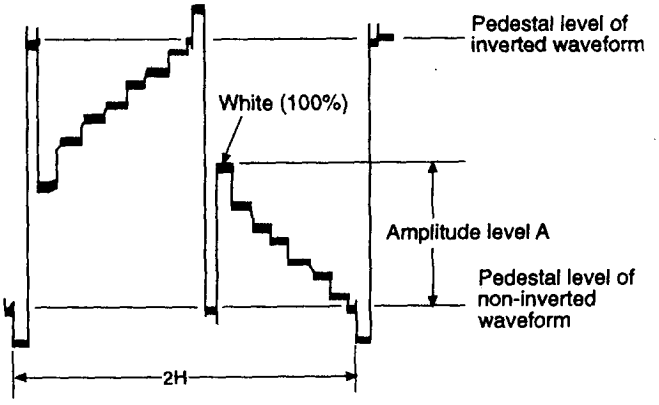
Mode	Playback
Signal	Color bar signal with the chroma and burst signal switched OFF.
Measurement point	PD-67 board CN301 pin ② (VG)
Measuring equipment	Oscilloscope [External trigger: CN302 Pin ④ (HSY)]
Adjustment page	F
Adjustment address	DD
Specified value	NTSC: A=3.45±0.05 Vp-p PAL: A=3.20±0.05 Vp-p

Note 1: Check that the BRIGHT knob is set to the center click position.

NTSC



PAL



Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	DD		Change data using the PLAY and STOP buttons until the amplitude (A) has
3				the specification value.
				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)
5				Connect C118 (0.01μF capacitor) (SD-21 board)

Note 2: After this adjustment, check BRIGHT of viewfinder. If it is incorrect adjust it again.

1-8. V-COM level adjustment (TYPE B only)

Purpose: Set to contrast of the image.

Adjustment Error: Image will be blue (whitish) or saturated.

Mode	Playback
Signal	Color bar signal with the chroma and burst signal switched OFF.
Measurement point	PD-67 board CN301 pin ⑧ (COM-O)
Measuring equipment	Oscilloscope
Adjustment page	F
Adjustment address	E1
Specified value	A=6.50±0.05 Vp-p

Note 1: Check that the BRIGHT knob is set to the center click position.

Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	E1		Change the data of page : F, address : E1, and adjust the V-COM level (A) to the specified value.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

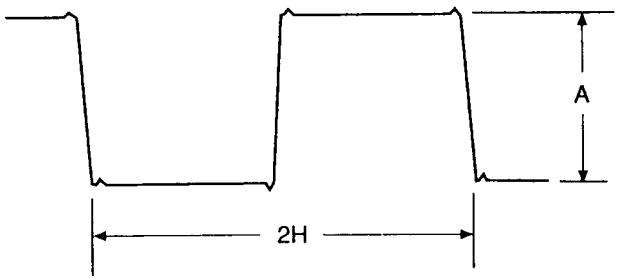


Fig. 6-3-6

Note 2: Execute always after the BRIGHT CONTRAST is adjusted.

1-9. COLOR adjustment

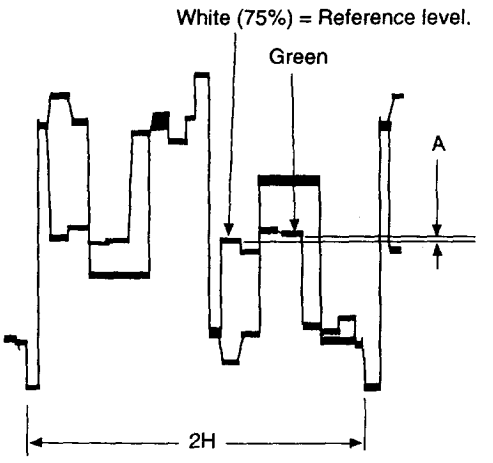
Purpose: Adjusts color for standard level.

Adjustment Error: Color will be too much or too small.

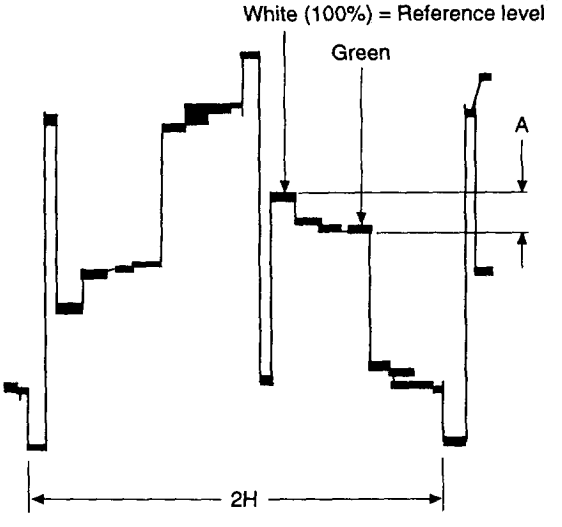
Mode	Playback
Signal	Color bar signal (with the chroma and burst signals)
Measurement point	PD-67 board CN301 pin ② (VG)
Measuring equipment	Oscilloscope [External trigger: CN301 pin ④ (HSY)]
Adjustment page	F
Adjustment address	D9
Specified value	TYPE A (NTSC): A=0.10±0.05 Vp-p (PAL): A=–0.30±0.05Vp-p TYPE B (NTSC): A=0.35±0.05 Vp-p (PAL): A=–0.60±0.05 Vp-p

Note 1: Execute after the BURST CLEANING is adjusted (PAL model only).

NTSC



PAL



Adjustment procedure:

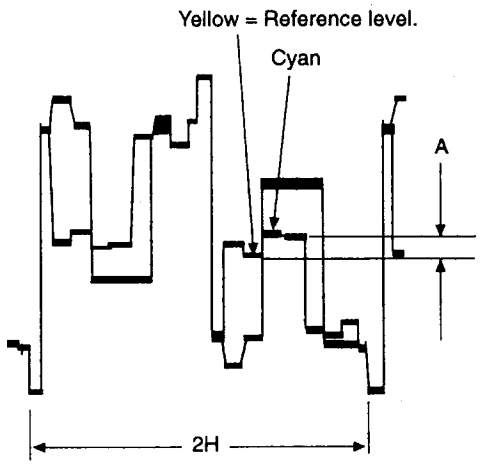
Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	D9		Change data using the PLAY and STOP buttons until the amplitude (A) has the specified value.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

1-10. HUE adjustment (NTSC model only)

Purpose: Adjust for standard hue.

Adjustment Error: Unnatural hue.

Mode	Playback
Signal	Color bar signal (with chroma and burst signals)
Measurement point	PD-67 board CN301 pin ② (VG)
Measuring equipment	Oscilloscope [External trigger: CN301 pin ④ (HSY)]
Adjustment page	F
Adjustment address	DA
Specified value	TYPE A: 0.20±0.05 Vp-p TYPE B: 0.30±0.05 Vp-p



Adjustment procedure:

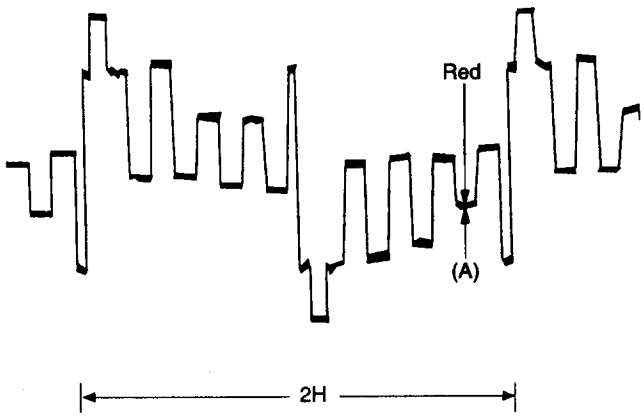
Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	DA		Change data using the PLAY and STOP buttons until the amplitude (A) has the specified value.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

1-11. BURST CLEANING adjustment (PAL model only)

Purpose: Adjust for standard hue.

Adjustment Error: Unnatural hue.

Mode	Playback
Signal	Color bar signal (with chroma and burst signals)
Measurement point	PD-67 board CN301 pin ③ (VB)
Measuring equipment	Oscilloscope [External trigger: CN301 pin ④ (HSY)]
Adjustment page	F
Adjustment address	DA
Specification	Minimum amplitude of the flicker of the red position.



Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	DA		Change data using the PLAY and STOP buttons until the amplitude (A) has the specified value.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

1-12. V-COM adjustment

Purpose: Adjusts for correct voltage of the DC bias voltage of the common electrode signal of the LCD panel.

Adjustment Error: Details of the LCD picture will be lost. Flicker occurs easily. Vertical stripes will appear.

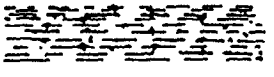
Mode	Playback PAUSE
Signal	Alignment tape: color bar for operation check segment NTSC: WR5-4NL PAL: WR5-4CL
Measurement point	To be confirmed on LCD display
Measuring equipment	
Adjustment page	F
Adjustment address	DF

Adjustment procedure:

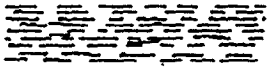
Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2				Establish the PB PAUSE state using operation keys of the camera.
3	F	DF		Change data using the PLAY and STOP buttons of the adjustment remote commander and observe the noise bar portion. Find the noise bar showing noise similar to head clogging. Keep pressing the PLAY button until black dots can be seen clearly. This data is D_A. Then keep pressing the STOP button until black dots can be seen clearly. This data is D_B.
4				Convert the D_A and D_B to the decimal value which are D_A' and D_B'. (Refer to Original Service manual page 6-12) [Conversion Table between hexadecimal and decimal values]. Then calculate D_C' using the equation $D_C' = (D_A' + D_B') \div 2$
5	F	DF		Set data to DC and press the PAUSE button.
6	6	00	00	After setting the data, press the PAUSE button. (End)

Note: This adjustment must be executed after the BRIGHT and CONTRAST adjustments are completed.

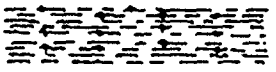
Keep pressing the PLAY button.

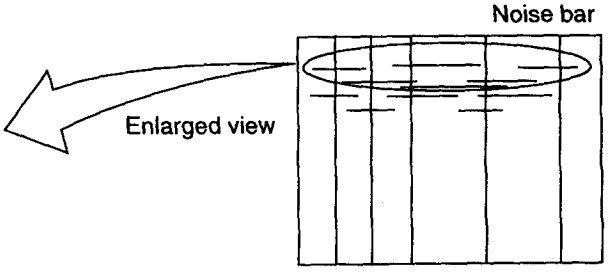


Find the noise bar showing noise similar to head clogging.



Keep pressing the STOP button.





1-13. White balance adjustment

Purpose: Adjust for correct white balance.

Adjustment Error: Color reproduction on LCD display will be poor.

Mode	Playback
Signal	Color bar signal with chroma and burst signals switched OFF
Measurement point	To be confirmed on LCD display
Measuring equipment	
Adjustment page	F
Adjustment address	DB DC
Specification	Image on the LCD display must not have any color.

Note1: Start adjustment within 30±5 seconds after the back-light turns ON.

Note2: During adjustment, the LCD protection film must be peeled off.

Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	DB DC		Change the DB and DC data using the PLAY and STOP buttons until the image on the LCD display has no color.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

1-2. PREPARATIONS BEFORE ADJUSTMENT
2-1. Precautions

1. Switch settings

Adjust the switches to the following positions without loading the cassette tape unless otherwise specified.

1) Camera/video power switch
   Operation switch block .....Camera
2) PROGRAM AE switch (PD-67 board S301).....AUTO
3) 16:9 WIDE switch (CF-42 board S486) .....OFF
   (CCD-TRV12: E, Hong Kong, Tourist/TRV12E/TRV12PK)
   STEADY SHOT switch (CF-42 board S486) .....OFF
   (CCD-TRV22/212)
4) D ZOOM switch (CF-42 board S300) .....OFF
   (EXCEPT CCD-TRV10E)
5) REC MODE switch (CF-42 board S483) .....SP

2. Adjustment sequence

Adjust in the given order.

3. Subject

1) Set the camera and pattern box as shown in Fig. 4-1-1.
2) Color bar chart (Standard picture frame)

- Adjust the picture frame as shown in Fig. 4-1-2.
- Adjust camera zooming and direction until the camera output waveform on the oscilloscope shown in Fig. 4-1-2 (a) and the color picture on the monitor TV shown in Fig. 4-1-2 (b) have been acquired.
- Maintain this setup until adjustment is complete.

3) White pattern (Standard picture frame)
   Remove the color bar chart from the pattern box and adjust the camera setup until the white pattern picture frame is the same size and same position as the color bar chart (the standard picture frame).

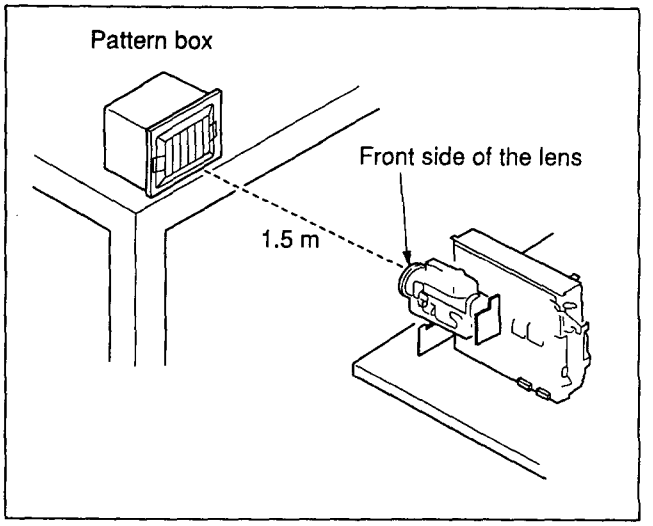


Fig. 4-1-1

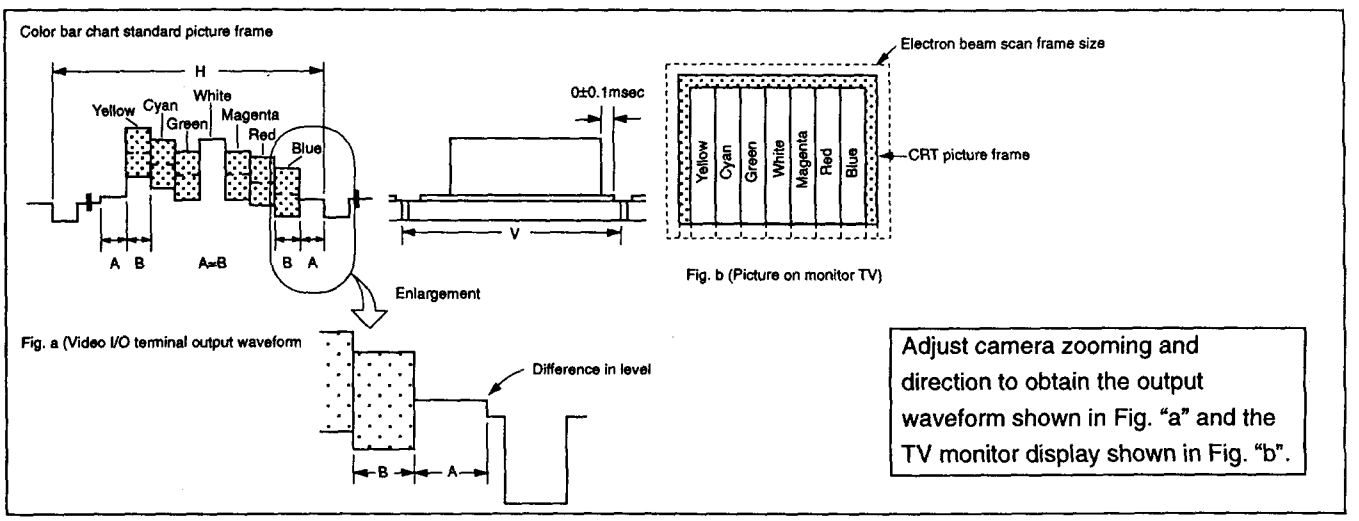


Fig 4-1-2

4) Chart for flange back adjustment
   Join together a piece of white A0 size paper (1189 mm × 841 mm) and a piece of black paper to make the chart shown in Fig. 4-1-3.

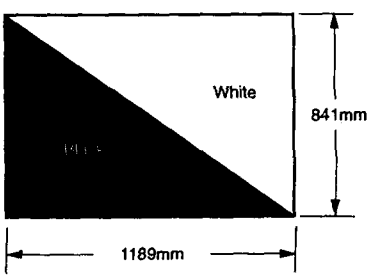


Fig 4-1-3

Note : Use a non-reflecting and non-glazing vellum paper. The size must be A0 or larger and the joint between the white and black paper must not have any undulations.

2-2. Page F data modofication

All the data of page F are automatically initialized if the initialization is executed. However, among the initialized data, the following addresses require manual modification of data after the page F data is initialized.

*CND : Canadian model

Modification procedure:

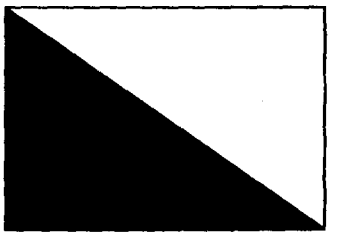
Order	Page	Address	Data				Procedure
			TRV12/12PK/112	TRV12E	TRV22/212	TRV10E	
			US, CND / OTHER				
1	6	00	01				After setting the data, Press the PAUSE button. (Preparation)
2	F	03	22 23	24	22	24	
		04	58	58	68	10	
		05	E1	E1	E1	E1	
		06	18	18	18	18	
		07	06	06	07	—	
		08	C4	D4	24	14	
		17	B9	—	B9	—	
		19	53	—	53	—	
		1A	7D	—	7D	—	
		1E	8D	—	8D	—	
		1F	9E	—	9E	—	
		20	8E	—	8E	—	
		21	85	—	85	—	
		2C	—	08	—	08	
		31	FB	—	FC	—	
		32	F4	—	F4	—	
		44	96	—	—	—	
		45	96	66	96	66	
		46	—	—	68	48	
		47	95	—	—	—	
		48	—	—	95	—	
		49	77	—	77	—	
		4B	77	—	77	—	
		4D	76	—	76	—	
		4F	76	—	76	—	
		53	A8	AD	A8	AD	
		54	AF	AF	AF	AF	Set each data to each address, and press the PAUSE button.
		5A	7A	—	7A	—	
		5C	1B	—	17	—	
		5D	34	—	32	—	
		5E	24	24	—	24	
		60	—	—	15	—	
		61	A7	A5	BA	A4	
		62	—	—	C3	—	
		63	B3	82	B2	85	
		64	38	36	1E	—	
		65	—	—	00	—	
		67	05	—	01	—	
		68	—	—	6B	—	
		6B	—	—	6C	—	
		6C	—	—	5C	—	
		72	—	—	20	—	
		74	—	—	3C	—	
		76	00	—	00	—	
		78	E8	—	E0	—	
		79	30	—	30	—	
		7A	10	—	10	—	
		7D	26	64	26	64	
		87	—	—	1F	—	
		88	—	—	20	—	
		89	82 B2	82	82	—	
		8B	—	D0	—	D0	
		E4-EF	00	00	00	00	
		F5	A8	A8	A8	A8	
		F6	5E	5E	5E	5E	
		F7	CC	C0	C6	94	

2-3. Flange back adjustment

Purpose: Automatic flange back adjustment of inner focus lens.

Adjustment error: Loss of focus when switched between auto focus and manual focus.

Subject	Chart for flange back adjustment (Placed 2000 ±5 mm in front of the lens with illumination of 300 ±50 lux.)
Measurement Point	Confirm the focus on monitor TV.
Measuring Instrument	Confirm focus on monitor TV
Adjustment Page	F
Adjustment Address	3C 3D 3E 3F 40 41 42



(Chart for flange back adjustment)
(See Page 6-2)

Note : Confirm that the "Camera-shaking correction" and "Digital Zoom" are turned Off.
(EXCEPT CCD-TRV10E)

Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Check that the center of the flange back adjustment chart coincides with that of the display on the monitor at both ends: TELE end and the WIDE end of the zoom lens.
2	6	00	01	After setting the data, press the PAUSE button. (Preparation)
3				Confirm that the data at page F, address 1B is the initial value, referring to the "Page F address list".
4	6	11		Confirm that the data is 00.
5	6	42	02	After setting the data, press the PAUSE button.
6	6	43	01	After setting the data, press the PAUSE button.
7	6	01	13	After setting the data, press the PAUSE button.
8	6	01	15	After setting the data, press the PAUSE button. The adjustment data is automatically input to page: F, addresses: 3C to 42.
9	6	11		Confirm that the data is 01.

Processing after Adjustments:

Order	Procedure
1	Turn the main power supply (7.2 V) OFF, then ON. (If this step is not performed, the camera will be out of focus.)

- For the flange back check, refer to the Service Manual for CCD-TRV11/TRV11E/TRV21/TRV21E/TRV21PK.
(SEE PAGE 6-17)

2-3. Camera-shaking correction adjustment [CCD-TRV22/TRV212 MODEL]

The "Camera-shaking correction adjustment" is necessary only when the angular speed sensor is replaced. If microprocessors or circuit is replaced or repaired, this adjustment is not necessary. Make operation check only.

Subject	
Measurement Point	VIDEO output terminal (Terminated in 75Ω)
Measuring Instrument	Oscilloscope or TV monitor
Adjustment Page	F
Adjustment Address	42 43
Specification Value	Horizontal residual vibration ≦0.5μsec Vertical residual vibration ≦0.2msec

Note 1: Caution when replacing parts

The two types of parts: ENC05EA and ENC05EB are supplied. Use the same type of sensor as that of the defective sensor. If different type of either ENC05EA or ENC05EB is used, picture can vibrate vertically or horizontally during camera-shake correction. After replacement, make adjustment as described.

Note 2: Caution on angular speed sensor

The angular speed sensor has high precision vibrator inside. If the sensor is dropped, balance of the vibrator is lost resulting in faulty operation. Handle the sensor carefully.

Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	6	42	07	After setting the data, press the PAUSE button.
3	6	01	3F	After setting the data, press the PAUSE button.
4				Obtain the vertical data from the following equation using the value indicated on SE650 of the TZ-5 board as the sensor sensitivity value. (Result of calculation must be converted to hexadecimal value.) [Vertical data] Hex=$\frac{148d}{\text{sensor sensitivity value}}$ ×[Hex]
5	F	42		Set the [Vertical data] Hex value to the page F, address 42 and press the PAUSE button.
6				Obtain the horizontal data from the following equation using the value indicated on SE651 of the TZ-5 board as the sensor sensitivity value. (Result of calculation must be converted to hexadecimal value.) [Horizontal data] Hex=$\frac{121d}{\text{sensor sensitivity value}}$ ×[Hex]
7	F	43		Set the [Horizontal data] Hex value to the page F, address 43 and press the PAUSE button.
8				Confirm that "Camera-shaking correction adjustment" works correctly.
9	6	00	00	After setting the data, press the PAUSE button. (End)
10	6	42	00	After setting the data, press the PAUSE button.
11	6	01	00	After setting the data, press the PAUSE button.

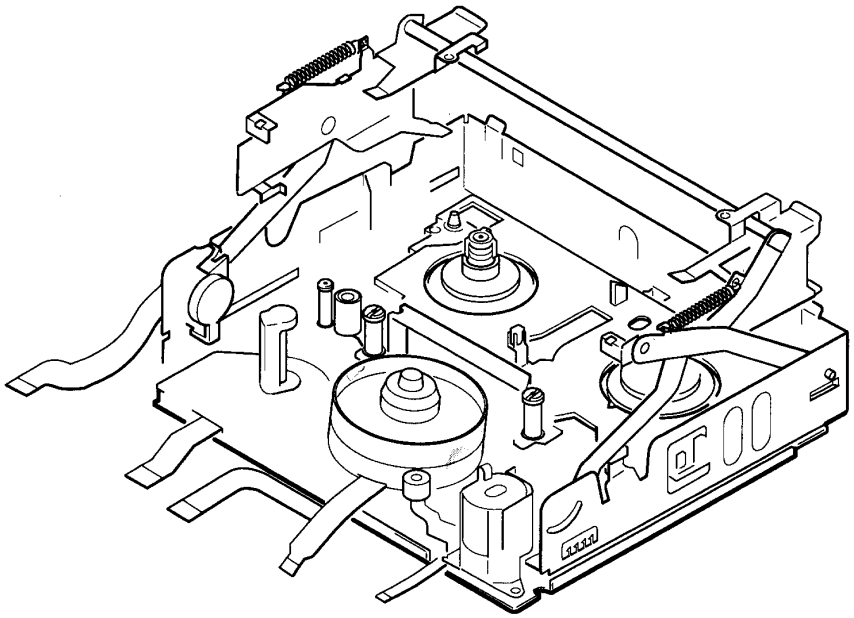
Note : Phase of the residual vibration must be in the same phase as that while no correction is applied.

8mm Video MECHANICAL ADJUSTMENT MANUAL Ⅶ

B MECHANISM

Video8

Use this mechanical adjustment manual Ⅶ together with the service manual of the respective models.



MICROFILM

8 MECHANISM DECK

SONY®

TABLE OF CONTENTS

1. PREPARATION FOR CHECKING, ADJUSTING AND REPLACING THE MECHANISM

1-1. Cassette Compartment Block Assy ····· 3
1-2. How to Operate the Mechanism with the Cassette Compartment Block Assy Removed ····· 4

2. PERIODIC CHECK AND MAINTENANCE ITEMS

2-1. Rotary Drum Assy Cleaning ····· 5
2-2. Tape Path Cleaning ····· 5
2-3. Periodic Check Items ····· 6
2-4. Service Tool List ····· 7

3. CHECKING, ADJUSTING AND REPLACING THE MECHANISM

3-1. HC Roller Block Assy ····· 8
3-2. Drum Assy ····· 9
3-3. Drum Base Block Assy, Shaft Ground ····· 10
3-4. Gooseneck Retainer, Gooseneck Gear Assy ····· 11
3-5. LS Chassis Block Assy, Mechanical Chassis Block Assy ····· 12
3-6. T Reel Table Assy, T Ratchet, T Soft Gear Block Assy ····· 15
3-7. Tension Regulator Band Assy, TG1 Arm Assy, S Reel Table Assy, S Ratchet, S Ratchet Release Plate, RVS Arm ····· 16
3-8. Pinch Arm Assy, TG4 Arm Block Assy ····· 17
3-9. LS Cam Plate, LS Guide Cover, Lid Opener, EJ Arm, Lock Guide ····· 18
3-10. Guide Base (S) and (T) Block Assemblies, Guide Rail ····· 19
3-11. DC Motor Assy (Loading) ····· 21
3-12. Tension Regulator Plate 2, Relay Gear, M Slider Assy ····· 22
3-13. LS Arm, HC Drive Arm, Pinch Press Plate, Tension Regulator Plate ····· 23
3-14. Cam Gear ····· 24
3-15. GL Slider Assy, GL Arm ····· 25
3-16. Rotary Switch ····· 26
3-17. Capstan Motor ····· 27
3-18. Tension Regulator Position Adjustment ····· 28
3-19. FWD Tape Hold -Back Tension Adjustment ····· 29

4. TAPE PATH ADJUSTMENT

4-1. Preparations for Adjustment ····· 30
4-2. Tracking Adjustment ····· 31
4-3. No. 4 Guide (TG-4) Adjustment ····· 31
4-4. CUE, REV Waveforms Check ····· 32
4-5. Checks After Adjustments ····· 32

5. EXPLODED VIEWS

5-1. Cassette Compartment Block Section ····· 34
5-2. LS Chassis Block Section ····· 35
5-3. Mechanism Chassis Block Section ····· 36

6. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM ····· 37

7. ELECTRICAL PARTS LIST ····· 38

For the mode selector operation, schematic diagram and parts list, refer to the Supplement-1 Manual.

1. PREPARATION FOR CHECKING, ADJUSTING AND REPLACING THE MECHANISM

For the disassembly procedures of the cabinet and printed wiring boards, please refer to the "DISASSEMBLY" section of the service manual of the respective models.

To re-assemble the mechanical parts which are disassembled in the following sections, perform the disassembly steps in reverse, unless otherwise specified.

The mechanisms are adjusted while set in the USE mode of operation. (Refer to the "Mode Selector Operation Procedure of the Supplement-1 Manual for how to enter the USE mode.)

1-1. Cassette Compartment Block Assy

1. Disassembly Procedure (Refer to Fig. 1.)

1) Set the mechanism to USE mode.
2) Confirm that the Cassette Compartment Block Assy is opened. If it is not opened, open it referring to Fig. a.
3) Remove the claws Ⓐ and Ⓑ of the Damper Assy ① from the chassis.
4) Remove the washer ② from the shaft of the Cassette Compartment near the Drum, next to the loading motor. Remove the shaft of the arm from the slot.
5) Remove the shaft of the arm from the slot Ⓒ of the Cassette Compartment near the Drum, next to the capstan motor. (Refer to Fig. b)
6) Lift up the Cassette Compartment at the Drum side in the direction of the arrow Ⓓ, and remove the arm shaft of the Cassette Compartment from the LS Chassis ④ near the Reel Tables. Remove the Cassette Compartment Assy ③ in the direction of the arrow Ⓔ.

2. Precautions During Re-Assembling

1) After attaching the Tension Spring, confirm that the straight portion at the end of the curved hook of the spring is positioned inside the mechanism. (Refer to Fig. c)
2) Confirm that the claw in the bottom of the shaft near the Reel Table of the Cassette Compartment is hooked to the LS Chassis.
3) Confirm that the claw of the Damper Assy is hooked to the LS Chassis. (Refer to Fig. b)

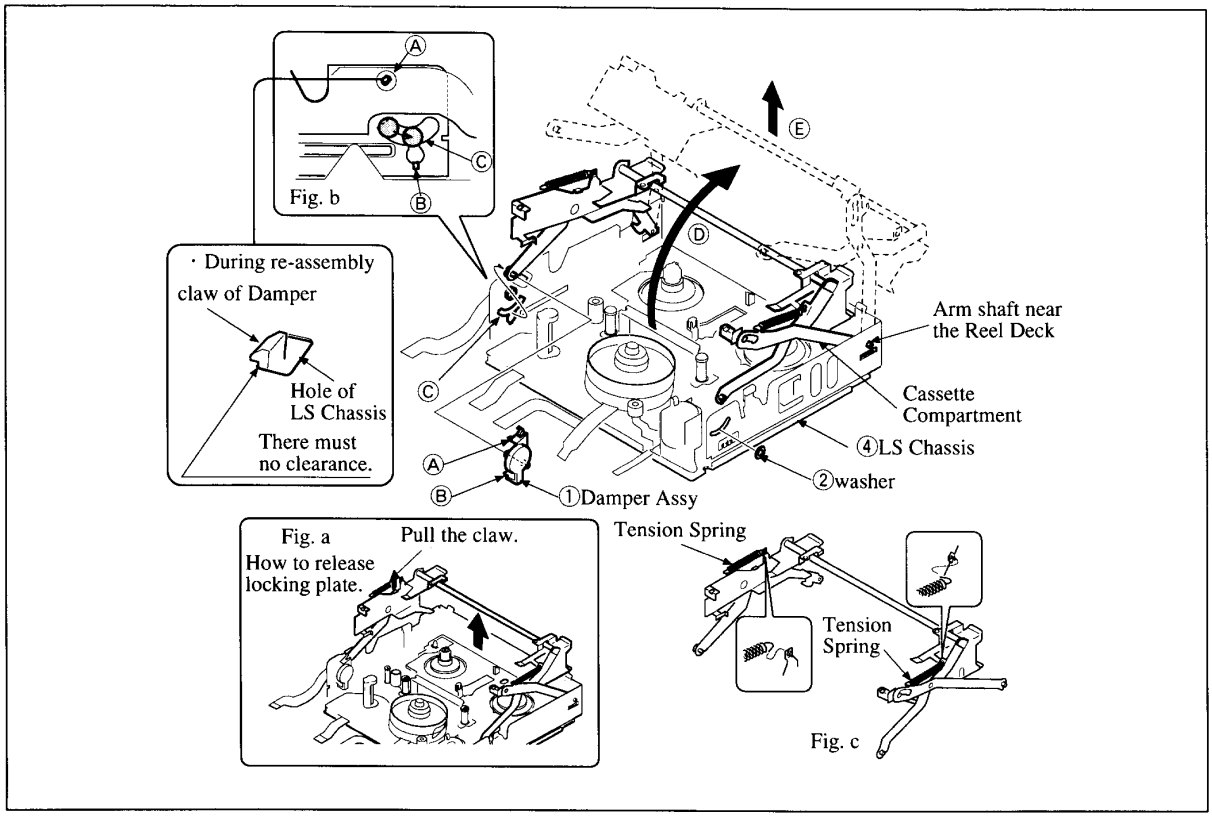


Fig. 1

1-2. How to Operate the Mechanism with the Cassette Compartment Block Assy Removed

1. How to load a cassette tape (Refer to Fig. 2):

1) While referring to section "DISASSEMBLY" of the respective service manual, turn the main power on with the cabinet and camera section removed. (It enables to operate the mechanical deck.)
2) Connect the adjustment remote commander (Ref. No. J-10) and establish the TEST mode.

> Example of establishing the TEST mode: model CCD-TR420E/TR440E.
> Select page: 6, address: 00, set data :01 and press the PAUSE button to release protection.
> Select page: 7, address: 01, set data: 01 and press the PAUSE button.
> After tape loading or other desired operations of mechanism are completed, be sure to perform the following:
> Select page: F, address: 01, set data :00 and press the PAUSE button.
> Select page: 6, address: 00, set data: 00 and press the PAUSE button.

3) Press the push-switch ① knob in the direction of the arrow which sets the machine into loading mode.

☆ PB, FF/REW and CUE/REV operations are possible.

2. How to establish RECORD mode:

1) Press pin of the push-switch ② (ON state) and keep the ON state by fixing with adhesive tape ③.
2) Turn the main power switch ON (select VTR or CAMERA position of in case of camera).
3) Set the RECORD switch to ON.
(When the TEST mode is selected, the rotation detection of the S and T reel tables is muted, and the top end sensor is disable which allow to run the tape.)

3. How to eject a cassette tape:

1) Press the EJECT switch to ON.

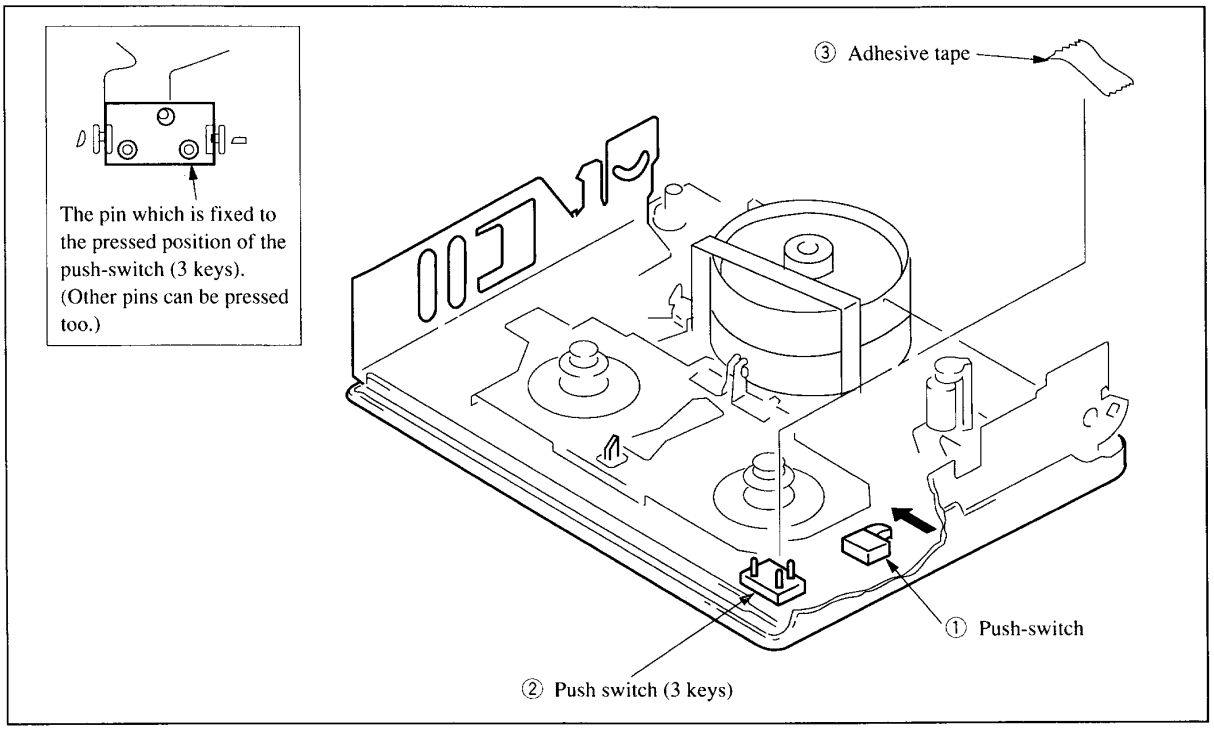

The pin which is fixed to the pressed position of the push-switch (3 keys). (Other pins can be pressed too.)
③ Adhesive tape
① Push-switch
② Push switch (3 keys)

Fig. 2

2. PERIODIC CHECK AND MAINTENANCE ITEMS

- Perform the following periodic check and maintenance to ensure that the machine functions continue to operate in peak condition, and to protect the tape and mechanism deck. After completing repair work, perform the following maintenance items regardless of how long the user's machine has been used.

2-1. Rotary Drum Assy Cleaning

Press the cleaning piece (Ref. No. J-2) moistened with cleaning fluid (Ref. No. J-1) lightly on the Rotary Drum Assy. Gently turn the Rotary Drum Assy slowly by hand counter-clockwise to clean the rotary drum.

Caution: Never attempt to turn the head drum motor by turning the main power ON. Also, never turn the drum clockwise by hand. In addition, never move the cleaning piece vertically with respect to the head tips, since this will damage them. Never clean the head drum in any way other than as described above.

2-2. Tape Path Cleaning (Refer to Fig. 3.)

1) Set the mechanism to USE mode. Clean the tape path system (TG-1, TG-2, TG-3, TG-4, pinch roller, capstan shaft) and lower drum using a very thin cotton swab (Ref. No. J-3) moistened with cleaning fluid.

Caution: Take care that the very thin cotton swab (Ref. No. J-3) does not touch the oil or grease of the various link mechanisms.

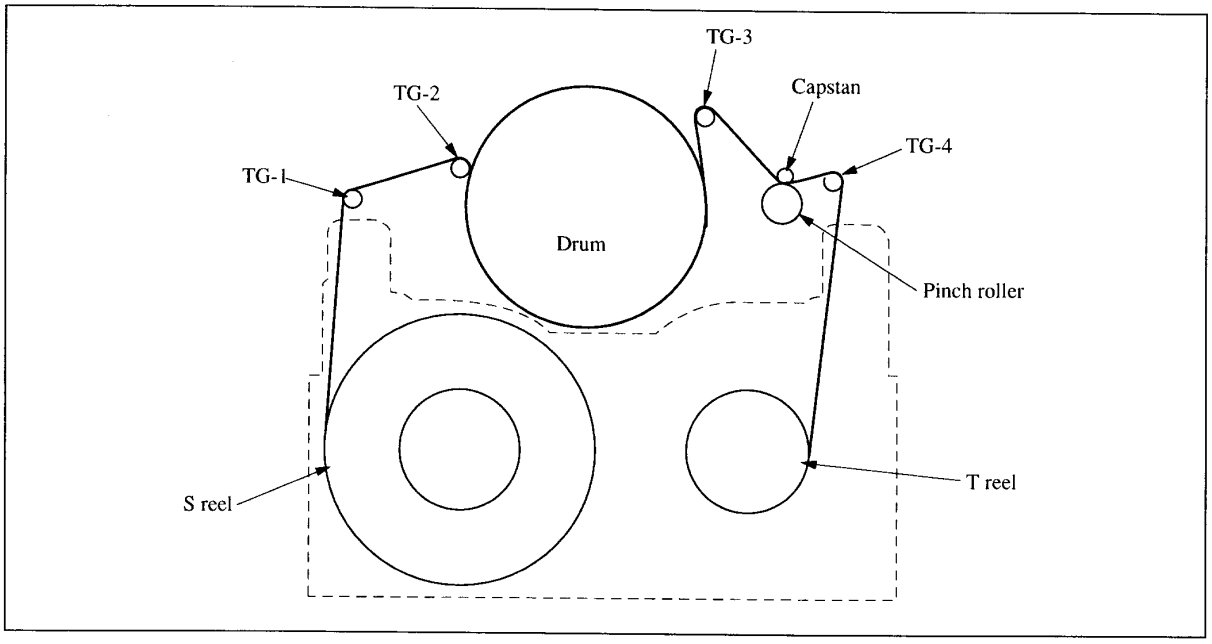


Fig. 3

2-3. Periodic Check Items

	Maintenance and Inspection Points	Operating Hours										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
	Cleaning of tape running surface	○	○	○	○	○	○	○	○	○	○	Take care not to get oily.
	Cleaning and degaussing of Rotary Drum Assy	○	○	○	○	○	○	○	○	○	○	Take care not to get oily.
Drive System	Timing Belt	—	☆	—	☆	—	☆	—	☆	—	☆	3-965-546-01
	Capstan Shaft	—	◎	—	◎	—	◎	—	◎	—	◎	Take great care not to let any oil contact the tape running surface.
	Change Gear Shaft Relay Pulley Shaft	—	◎	—	◎	—	◎	—	◎	—	◎	
	Loading Motor	—	☆	—	☆	—	☆	—	☆	—	☆	X-3945-401-1
Performance Check	Abnormal Sound	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
	Tape Hold-back Tension Measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
	Brake System	—	☆	—	☆	—	☆	—	☆	—	☆	
	FWD / RVS } Torque Measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

○Cleaning ◎Lubrication ☆Check

Note: When overhauling the machine, replace the parts while referring to the above table.

Note: Regarding oil

- Be sure to use the specified oil. (If the viscosity and other characteristics are different, various troubles may arise.)
  Oil: Sony part No. 7-661-018-18
  (Mitsubishi diamond oil hydro fluid NT-68)
- For the oil lubricated bearings, use oil free from dust or foreign materials. If the oil contains any dust or foreign material, the bearings will wear out quickly or burn out.
- One drop of oil is the amount of oil which forms at the tip of a stick of 2 mm diameter.

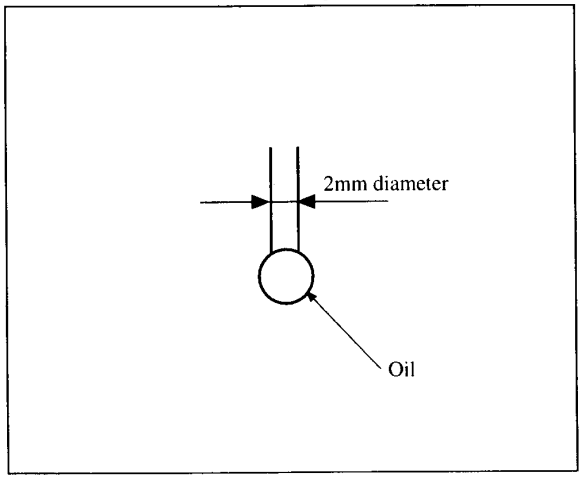


Fig. 4

2-4. Service Tool List

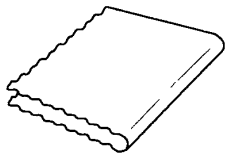
Ref. No.	Name	Parts Code	Tool Stamp	Applications
J-1	Cleaning fluid	Y-2031-001-0	—	
J-2	Cleaning piece	2-034-697-00	—	
J-3	Very thin cotton swab (made by Nippon Cotton Swab Inc. (P752D))		—	
J-4	Head demagnetizer	Commercially available	—	
J-5	Dental mirror Spare mirror	J-6080-029-A J-6080-030-1	SL-5052	Tape path
J-6	Alignment tape (NTSC : WR5-1NP) (PAL : WR5-1CP)	8-967-995-02 8-967-995-07	—	Tape path
J-7	FWD/RVS take-up torque cassette	J-6080-824A	GD-2086	
J-8	Screwdriver for tape path adjustment	J-6082-026-A	—	For tape guide adjustment
J-9	FWD/BACK tension adjustment screwdriver	J-6082-187-A	—	
J-10	Remote commander for adjustment	J-6082-053-B	—	Tape path (Setting PATH mode)
J-11	MD process table	J-6082-166-A	—	
J-12	FLOIL Grease SG-941	7-662-001-39	—	
J-13	FLOIL Grease SG-055G	7-651-000-09	—	

Other equipment

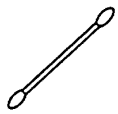
- Oscilloscope
- Analog circuit tester (input impedance 20 kΩ)

J-1

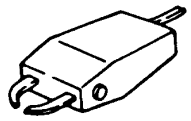
J-2



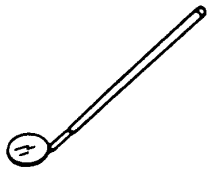
J-3



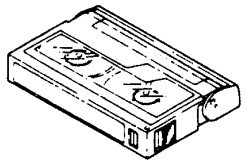
J-4



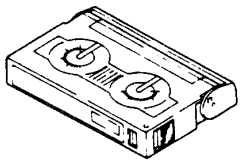
J-5



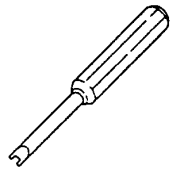
J-6



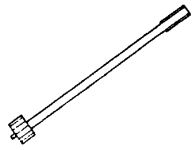
J-7



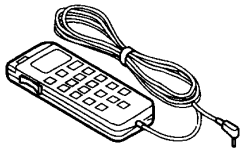
J-8



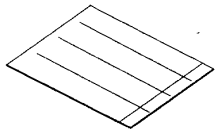
J-9



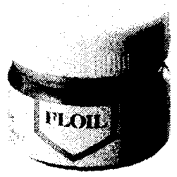
J-10



J-11



J-12



J-13

3. CHECKING, ADJUSTING AND REPLACING THE MECHANISM

3-1. HC Roller Block Assy (Refer to Fig. 5)

1. Disassembly Procedure

1) Remove the Torsion Spring ① from the cut-out Ⓐ of the motor holder. Hook it to the claw Ⓑ of the HC Arm.
2) Remove the HC Roller Block Assy in the direction shown by Ⓒ.
3) Remove the stop washer ② and remove the HC Roller Block Assy ③.

2. Precautions During Re-Assembly

1) After attaching the HC Roller Block Assy, confirm that both ends of the torsion spring are hooked to Ⓐ and Ⓓ.
2) Align the block so that the cut-out Ⓔ agrees with the rib Ⓕ.

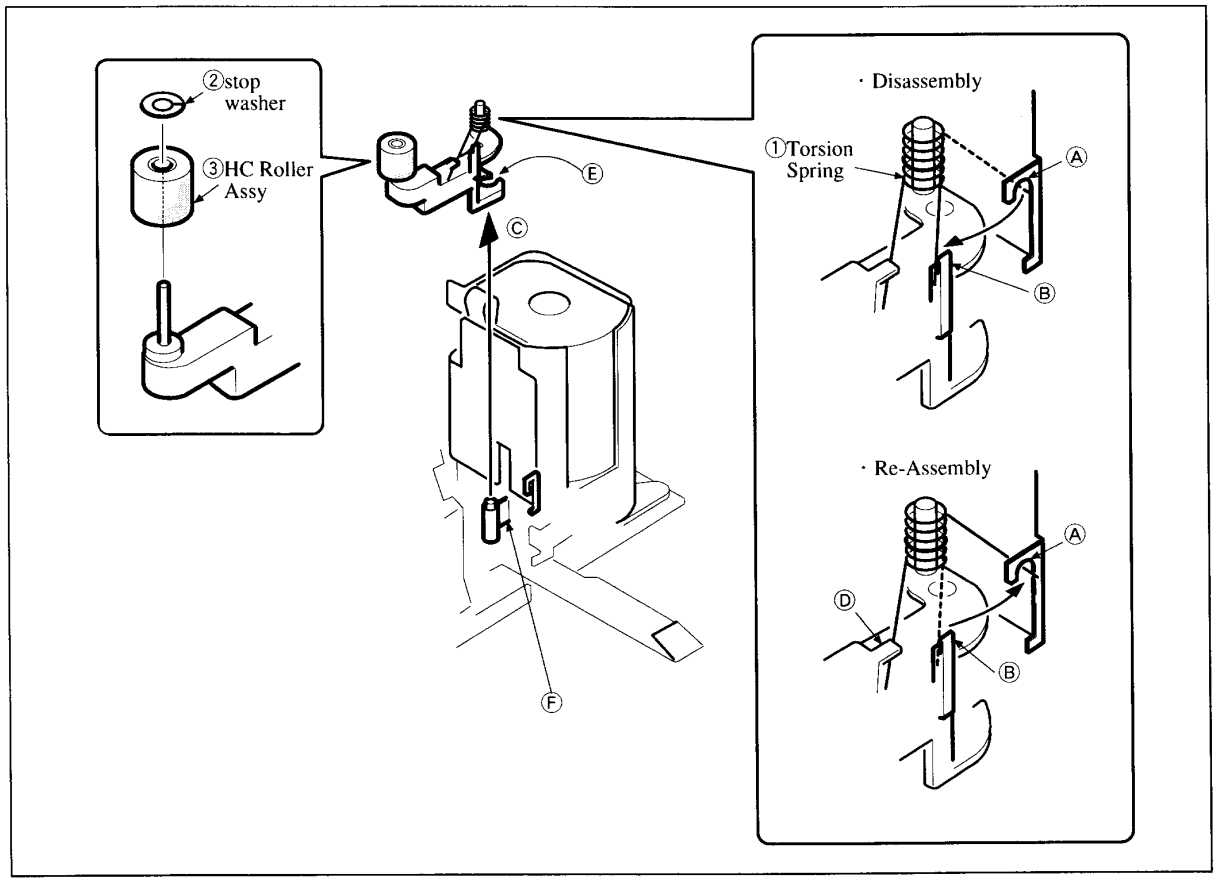


Fig. 5

3-2. Drum Assy (Refer to Fig. 6)

1. Disassembly Procedure

1) Set the mechanism to USE mode.
2) Remove the three screws (M 1.4) ① and remove the Drum Assy ②.

Caution: Be careful not to touch the outer circumference of the drum. (Hold the portions Ⓐ and Ⓑ of the drum assy.)

2. Precautions During Re-Assembly

1) Be careful not to touch the outer circumference of the drum. (Hold the portions Ⓐ and Ⓑ of the drum assy.)
2) When tightening the three screws (M 1.4), tighten them in the order Ⓒ, then Ⓓ, then Ⓔ.
3) After attaching the Drum Assy, perform the steps in section "4. TAPE PATH ADJUSTMENT".

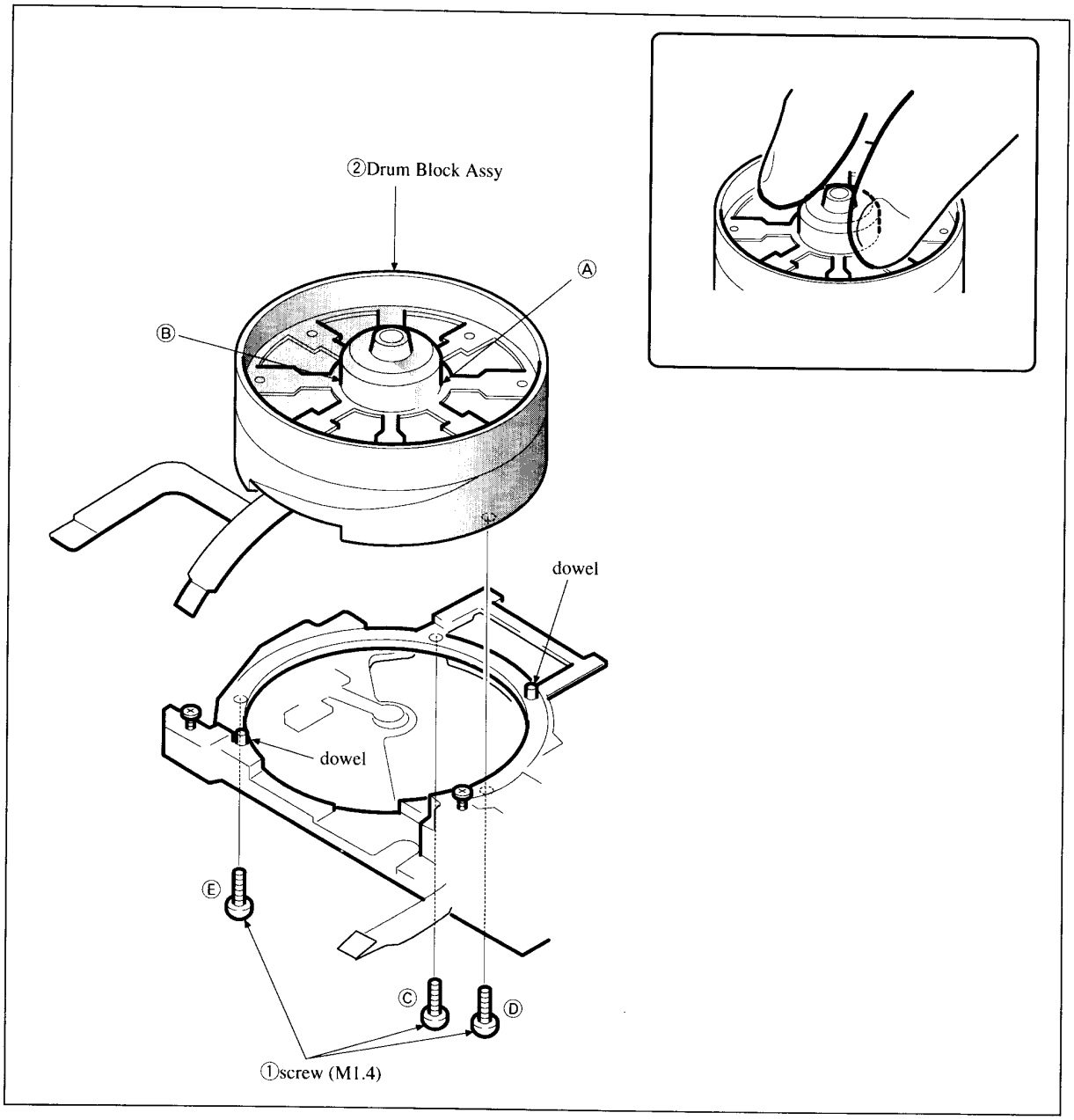


Fig. 6

3-3. Drum Base Block Assy, Shaft Ground (Refer to Fig. 7)

1. Disassembly Procedure

1) Remove the Drum Assy referring to section 3-2.
2) Remove the three screws (M 1.4×2.5) ① and remove the Drum Base Block Assy ②.
3) Remove the screw (M 1.7×1.4) ③ and remove the Shaft Ground ④.

Caution 1: Do not hold the spring portion of the Shaft Ground ④.

Caution 2: The loading motor can be removed while the mechanism is in this state. However, do not move any other mechanical parts (especially gears and cams around the rotary switch) when removing the loading motor. (Refer to 3-11.)

2. Precautions During Re-Assembly

1) Do not touch the spring portion of the Shaft Ground ④.
2) When tightening the three screws (M 1.4×2.5), tighten them in the order of Ⓐ, then Ⓑ, then Ⓒ.
3) After re-assembly is completed, perform the steps in section "4. TAPE PATH ADJUSTMENT".

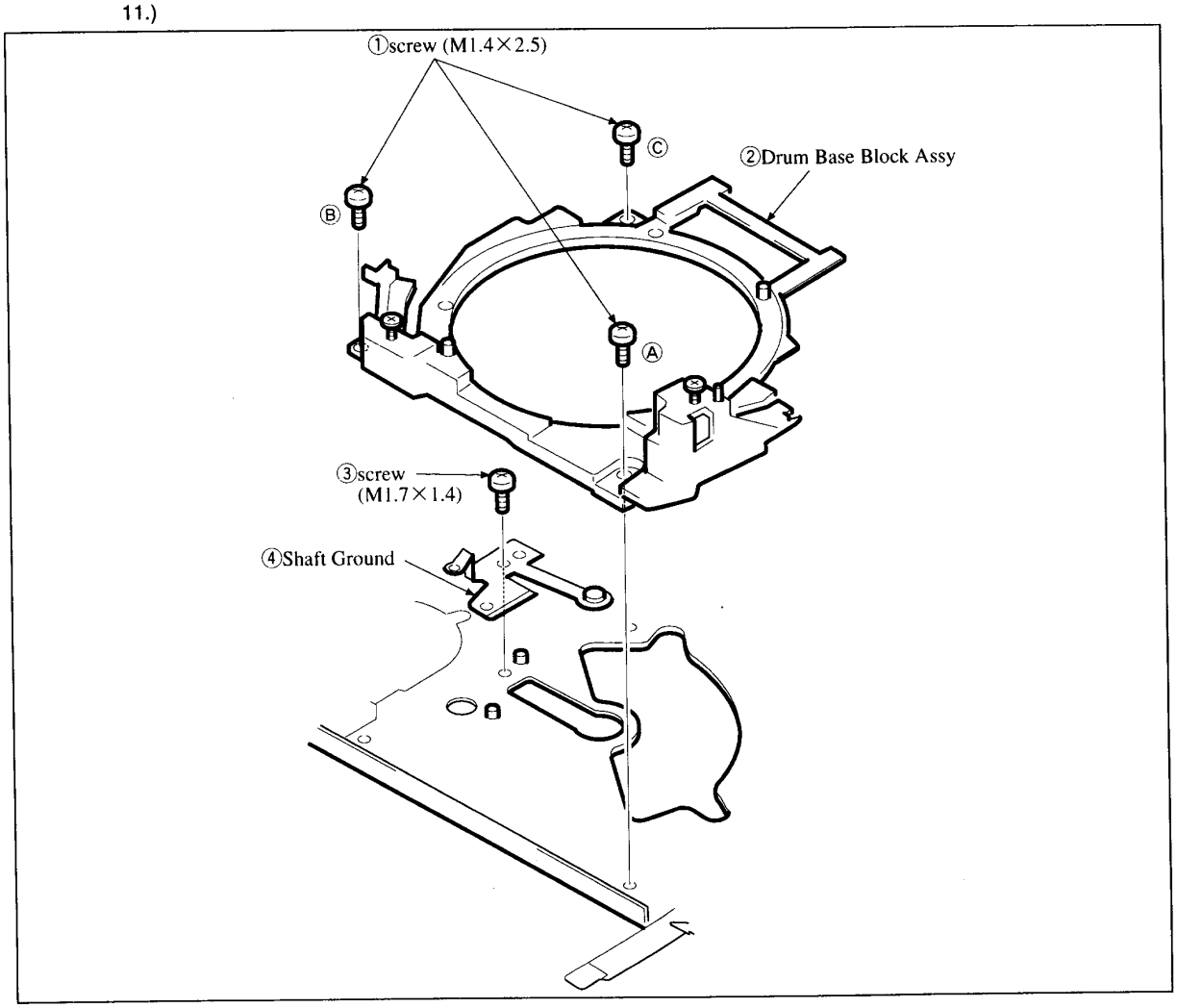


Fig. 7

3-4. Gooseneck Retainer, Gooseneck Gear Assy (Refer to Fig. 8)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the LED ① from the LED holder of the Gooseneck Retainer ③.
   (Turn the flexible board 90° outside and remove it upward.)
3) Remove the three screws (M 1.4×2.5) ② and remove the Gooseneck Retainer ③.
4) Remove the stop washer ④ and remove the Gooseneck Gear Assy ⑤.

2. Precautions During Re-Assembly

1) When attaching the Gooseneck Retainer ③, take care that the Gooseneck Retainer ③ does not collide with the tension regulator band. (The tension regulator band must be located inside.)
2) Hook the T-side claw on the guide.

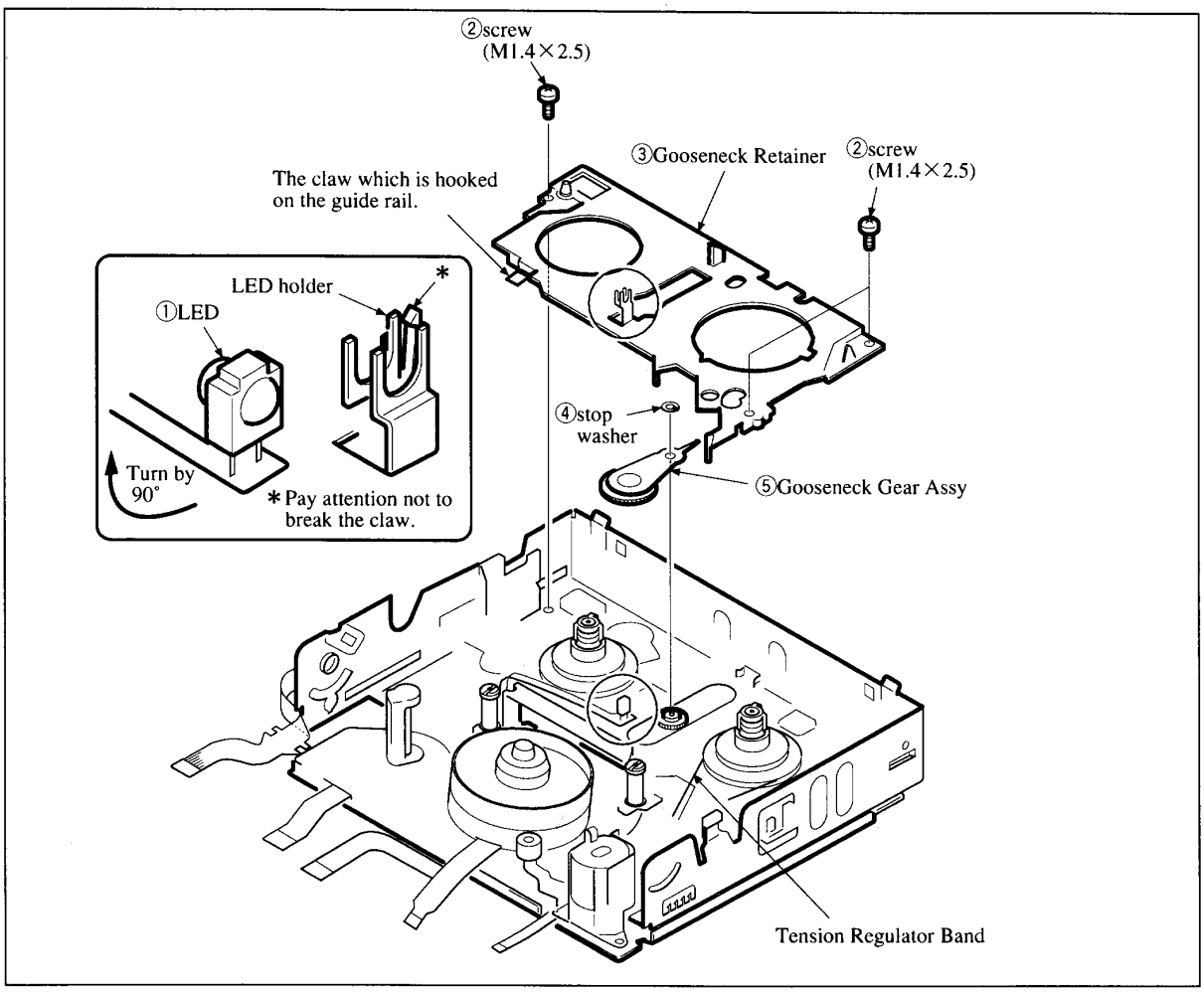


Fig. 8

3-5. LS Chassis Block Assy, Mechanical Chassis Block Assy (Refer to Fig. 9)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
3) Remove the FP-221 flexible board ① from the flexible board holder.
4) Remove the stop ring E1.5 ②.
5) Remove the two screws (M 1.4×2.5) ③ and remove the LS Chassis Block Assy ④ from the Mechanical Chassis Block ⑤ in the direction of the arrow Ⓐ.

Note: The Tension Regulator Plate (2) can easily fall into the Mechanical Chassis Block Assy. Take care not to drop it.

2. Precautions During Re-Assembly

1) Before attaching the LS Chassis Block Assy, confirm that the respective phase-determining holes have been adjusted for correct phase. Also confirm that the specified locations of the Mechanical Chassis Block Assy and the LS Chassis Block Assy are coated with grease SG-055G (Ref. No. J-13). (Refer to Fig. a)
2) When attaching the LS Chassis Block Assy, insert the LS Cam Plate (on the LS chassis side) into the dowel (on the mechanical chassis side). Also insert the TG1 Cam Axis (on the LS chassis side) into the Tension Regulator Plate (2) (on the mechanical chassis side).
3) When attaching these block assemblies, attach them while pressing the TG-1 Arm Assy in the direction toward the TG-2 Guide. (Refer to Fig. b)
4) Pay attention that the TG-1 Arm is not floated.

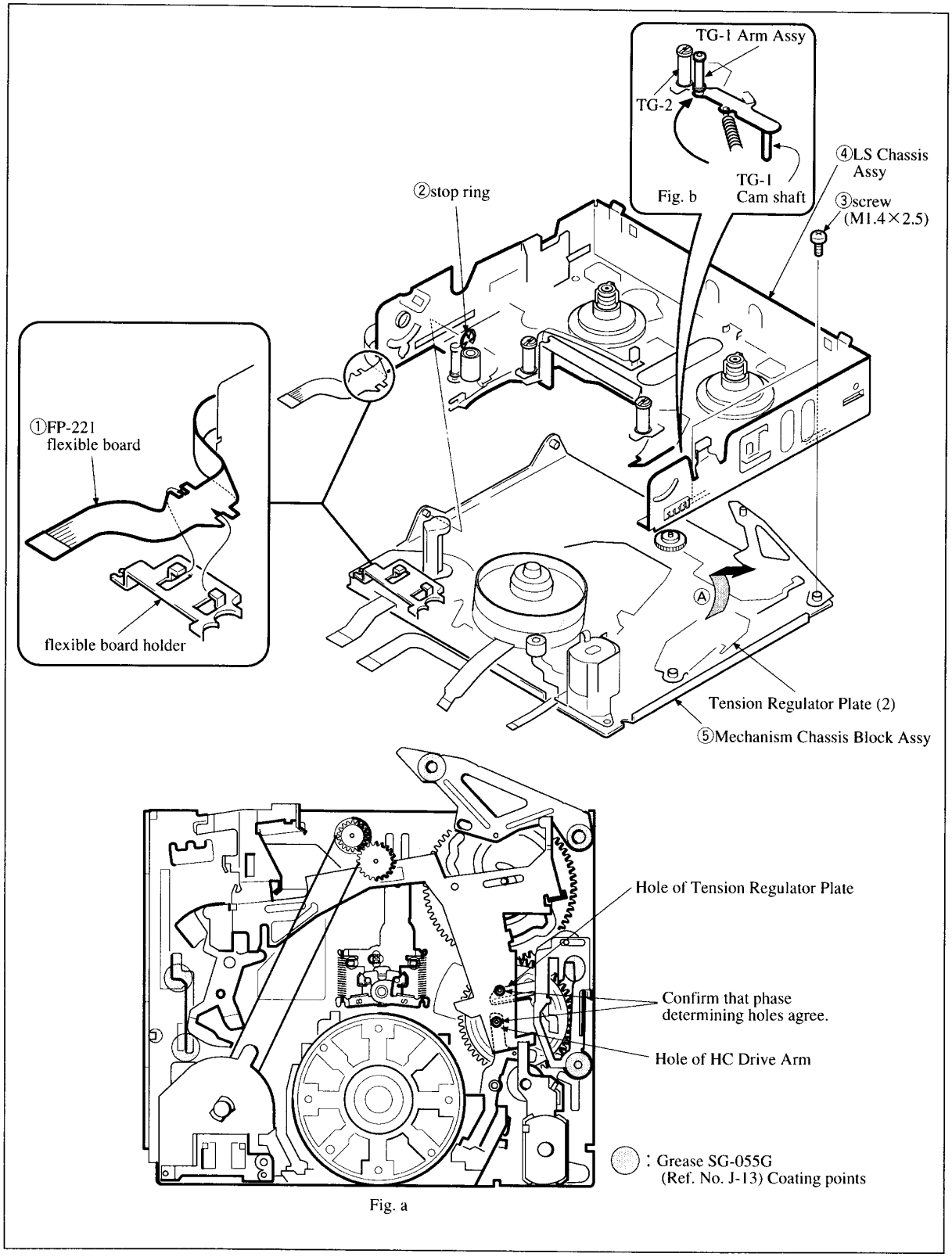

TG-1 Arm Assy
TG-2
TG-1
Cam shaft
Fig. b
④LS Chassis Assy
②stop ring
③screw (M1.4×2.5)
①FP-221 flexible board
flexible board holder
Ⓐ
Tension Regulator Plate (2)
⑤Mechanism Chassis Block Assy
Hole of Tension Regulator Plate
Confirm that phase determining holes agree.
Hole of HC Drive Arm
: Grease SG-055G (Ref. No. J-13) Coating points

Fig. a

Fig. 9

- **PARTS CONSTITUTING THE LS CHASSIS.**

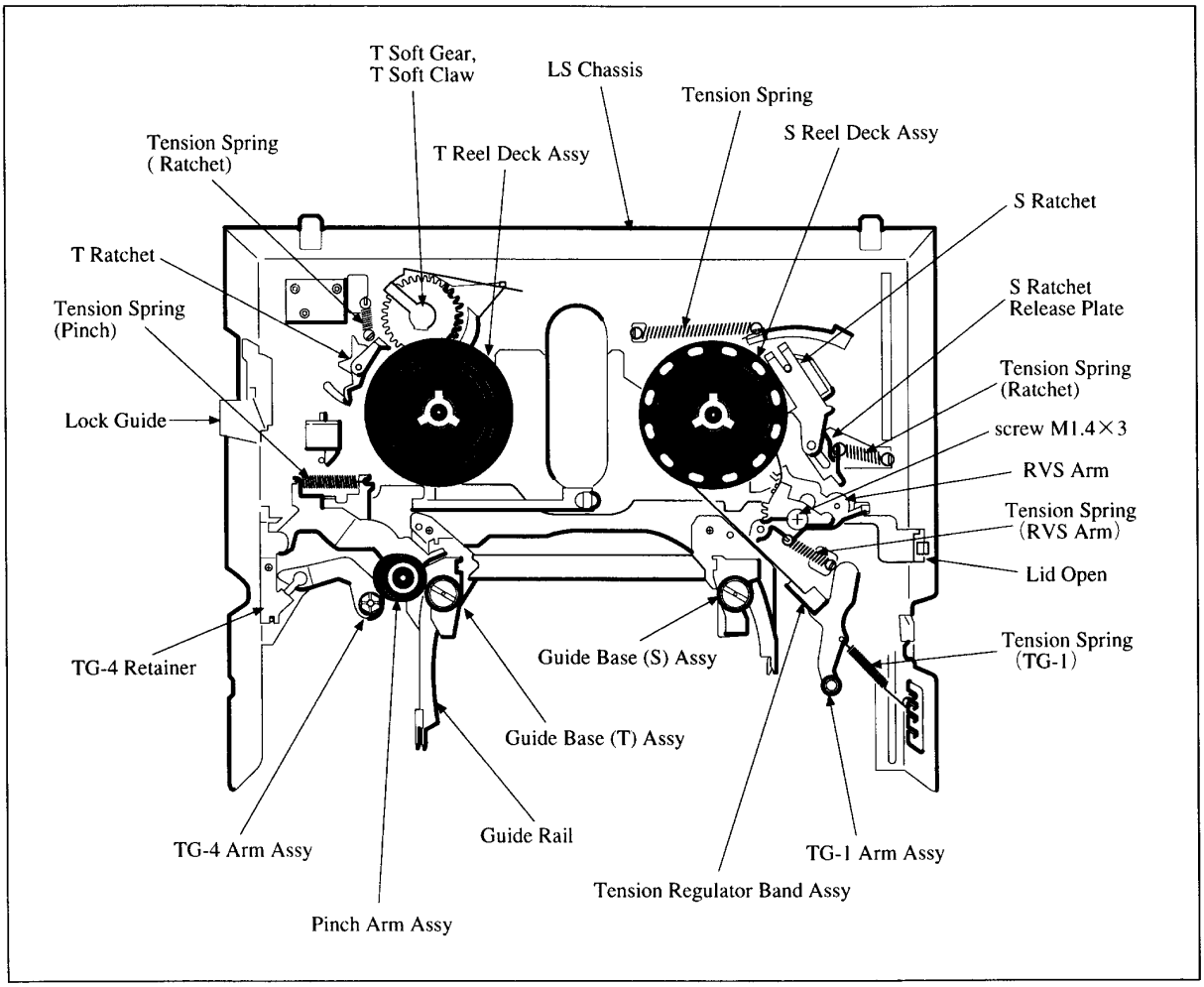


Fig. 10

3-6. T Reel Table Assy, T Ratchet, T Soft Gear Block Assy (Refer to Fig. 11)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
3) Remove the claw of the T Reel Deck Assy ① from the chassis and remove the T Reel Deck Assy from its shaft.
4) Remove the Tension Spring (Ratchet) ② from the LS Chassis and turn the T Ratchet ③ in the direction of the arrow Ⓐ and remove it .
5) Turn the T Soft Gear Block Assy ④ in the direction of the arrow Ⓑ and remove it .

2. Precautions During Re-Assembly

1) Confirm that the protrusions of both the T Soft Gear Block Assy and T Ratchet are securely locked to the LS Chassis.
2) Be careful not to deform the claw.

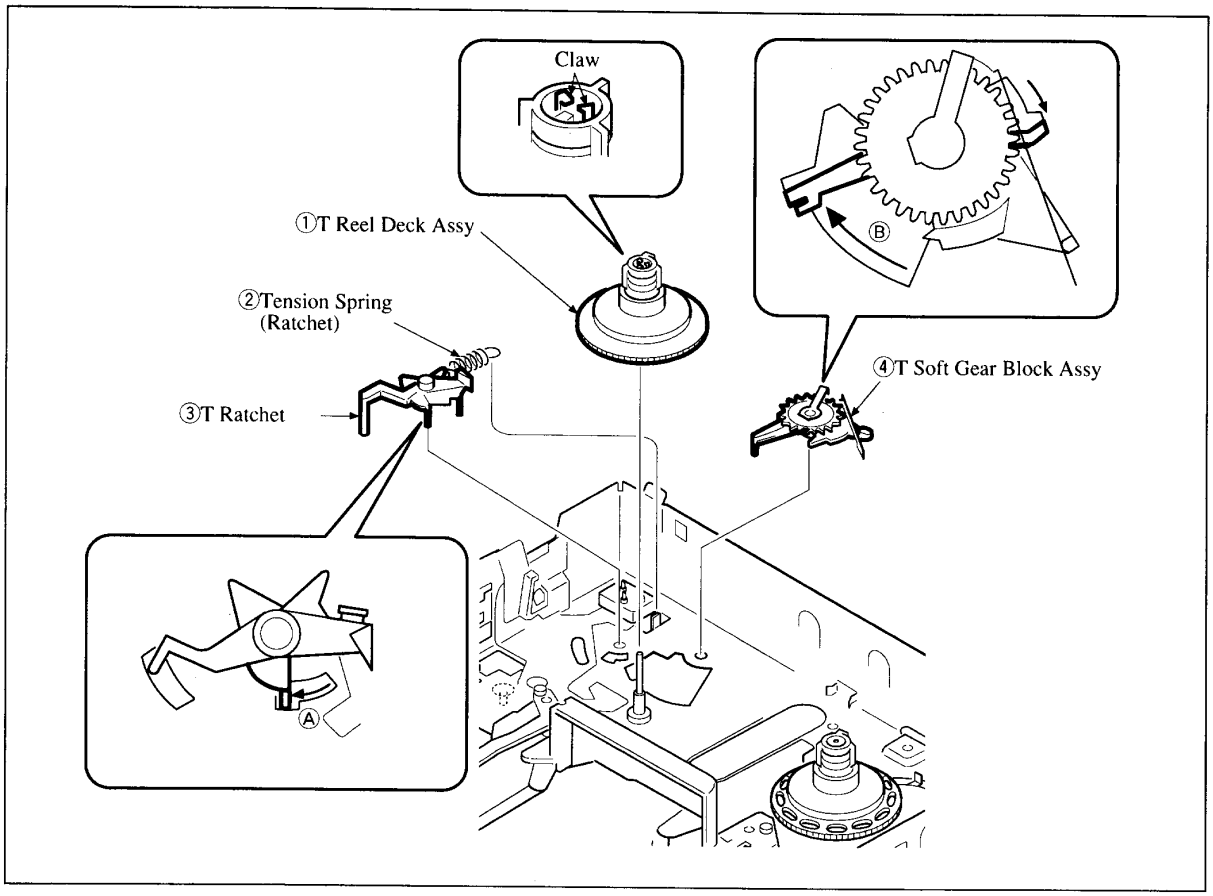


Fig. 11

3-7. Tension Regulator Band Assy, TG1 Arm Assy, S Reel Table Assy, S Ratchet, S Ratchet Release Plate, RVS Arm (Refer to Fig. 12)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
3) Remove the Tension Spring (TG1) ① from the LS Chassis.
4) Remove the screw (M 1.4×3) ② and remove the Tension Adjustment Block of the Tension Regulator Band Assy ④ form RVS Arm.
5) Release the S Ratchet ⑥ in the direction of the arrow Ⓐ and remove the Tension Regulator Band (while taking care not to bend the band) from the S Reel.
6) Remove the TG1 Arm Assy ③ from the LS Chassis, then remove the claw of the Tension Regulator Band Assy ④. (Refer to Fig. a)
7) Remove the claw of the S Reel Deck Assy ⑤ from the chassis and remove the S Reel Deck Assy from its shaft.
8) Remove the S Ratchet ⑥. (Because it is press-fitted, insert tip of screwdriver into the center of rotation and remove it.
9) Remove the Tension Spring (ratchet) ⑦ from the LS Chassis and remove the S Ratchet Release Plate ⑧.
10) Remove the Tension Spring ⑨ from the LS Chassis and remove the RVS Arm ⑩ by turning it..

2. Precautions During Re-Assembly

1) Confirm that the dowel of the S Ratchet Release Plate is inserted into the groove of the S ratchet and confirm that the center of the ratchet is press-fitted into bottom of the shaft. (It can be used again.)
2) When attaching the Tension Regulator Band Assy, take care not to bend it.
3) Pay attention that oil or grease is not spit on the surface of the Tension Regulated Band. (Pay attention also not to touch it with hand directly.)
4) Confirm that the tension regulator band is correctly inserted into the groove of the S Reel Deck Assy ⑤. (Refer to Fig. b)
5) When securing the Tension Adjustment Block using the screw, press it toward the position which gives the least tension, then tighten the fixing screw.
6) Before attaching the TG1 Arm Assy, coat the LS Chassis TG1 boss with oil (1/2 drop).
7) Do not touch the tape guide of the TG1 Arm Assy with bare hands.
8) Confirm that the claw of the S Reel Deck Assy is not deformed.

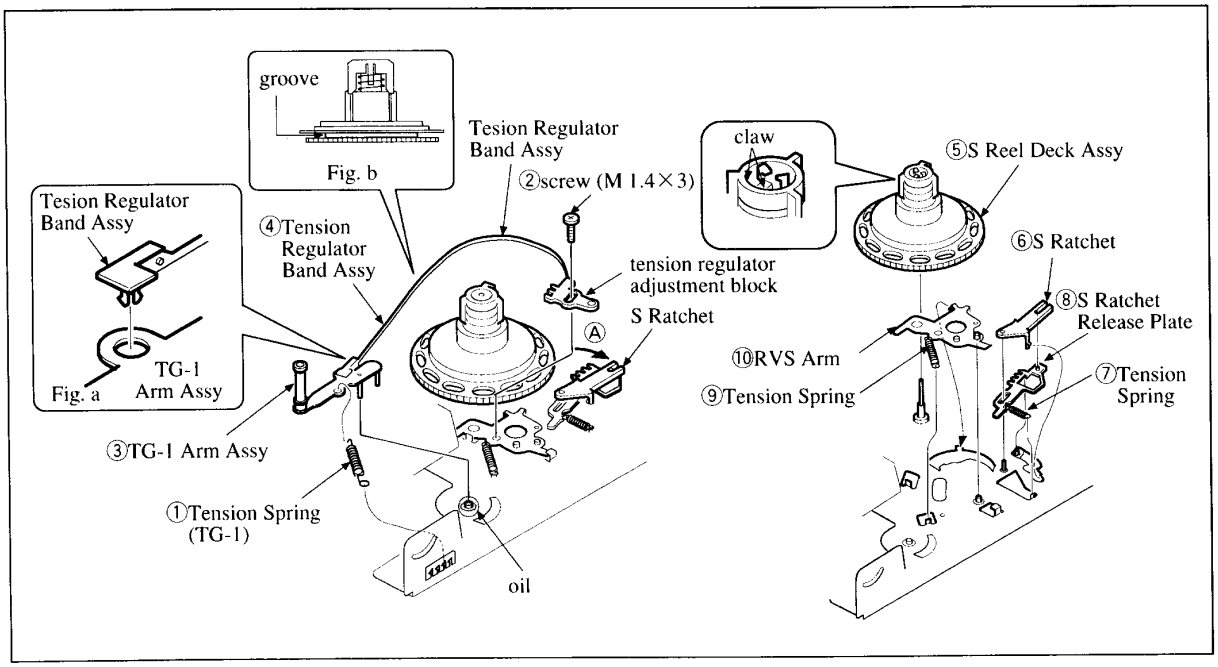


Fig. 12

3-8. Pinch Arm Assy, TG4 Arm Block Assy (Refer to Fig. 13)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
3) Remove the LS Chassis Block Assy referring to section 3-5.
4) Remove the Torsion Spring (pinch) ① from an end of Pinch Arm and hook it on the cut-out Ⓐ of the LS Chassis.
5) Remove the screw (M 1.4×2.5) ② and remove the TG4 Retainer ③.
6) Remove the TG4 Arm Block Assy ④ and remove the Torsion Spring ⑤ while paying attention to the Torsion Spring ⑤.
7) Remove the Pinch Arm Assy ⑥. (Caution: The Pinch Press Roller is easy to drop. Pay attention not to drop it.)
8) Remove the Torsion Spring (pinch) ① from the cut-out of the LS Chassis in the order of Ⓐ then Ⓑ.

2. Precautions During Re-Assembly

1) Before attaching these parts, coat the LS chassis pinch arm boss and TG4 arm boss with grease SG-055G (Ref. No. J-13).
2) Do not touch the tape guide of the TG4 Arm Block Assy and roller of the Pinch Arm Assy with bare hand.
3) After coating the Pinch Press Shaft of the Pinch Arm Assy ③ with grease SG-055G (Ref. No. J-13), attach the Pinch Press Roller.

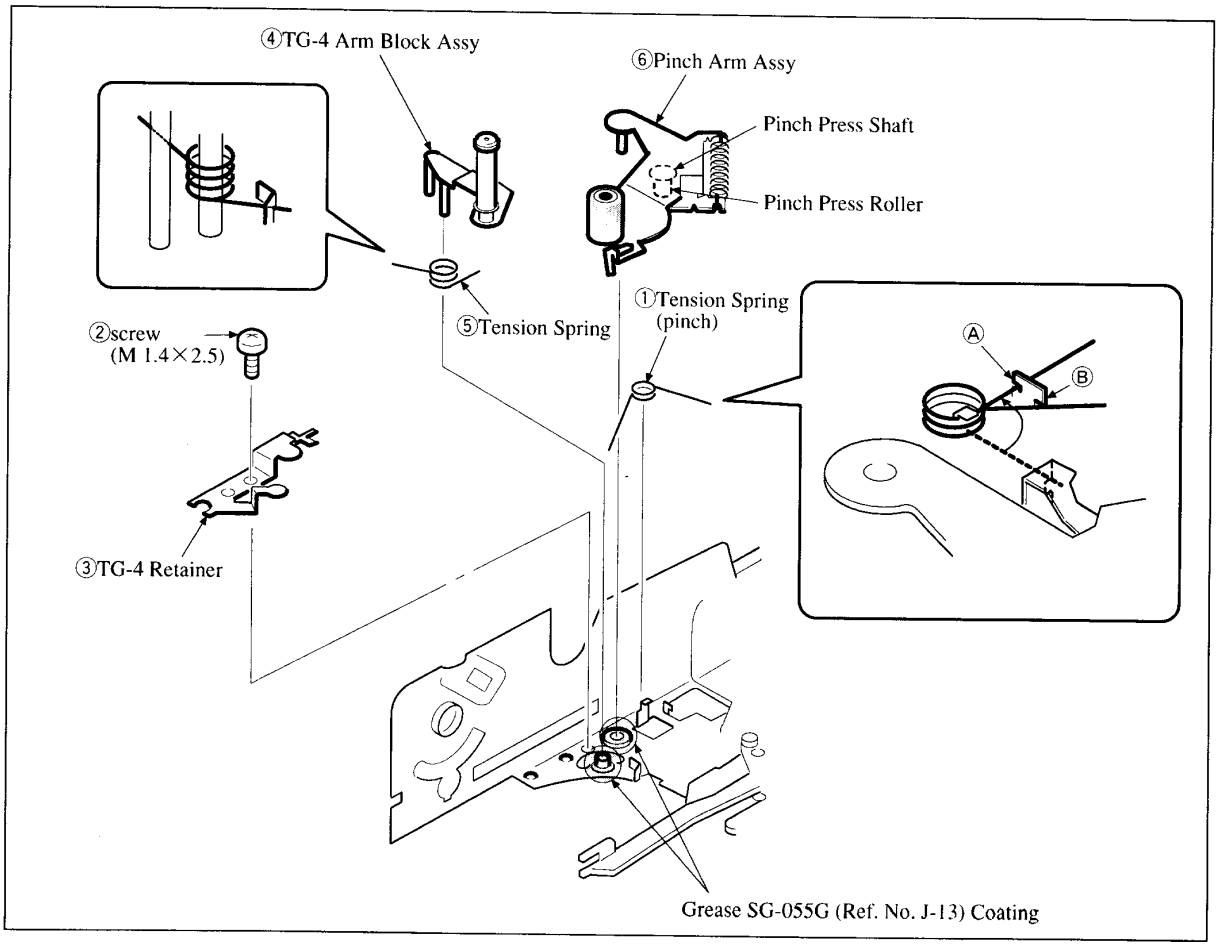


Fig. 13

3-9. LS Cam Plate, LS Guide Cover, Lid Opener, EJ Arm, Lock Guide (Refer to Fig. 14)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
3) Remove the LS Chassis Block Assy referring to section 3-5.
4) Remove the two screws (M 1.4×2.5) ① and remove the the LS Cam Plate ②.
   In this state, write a mark on the screw ① and on the LS Chassis indicating the position of the LS Cam Plate which helps during re-assembly.
5) Remove the LS Guide Cover ③.
6) Remove the Lock Guide ④ in the upward direction. (Refer to Fig. a)
7) Remove the Lid Open ⑤ in the direction of the arrow Ⓒ while pushing Ⓑ portion .
8) Remove the EJ Arm ⑥ . (The EJ Arm ⑥ is press-fitted. If the EJ Arm ⑥ is not damaged, it is not necessary to replace.)

2. Precautions During Re-Assembly

1) After the captioned parts are attached, confirm that the respective claws and dowels are engaged completely.
2) If the EJ Arm ⑥ is removed, be sure to replace it with the new replacement EJ Arm.
3) If any mark is not written when removing the LS Cam Plate ②, adjust and attack it as shown in Fig. b.

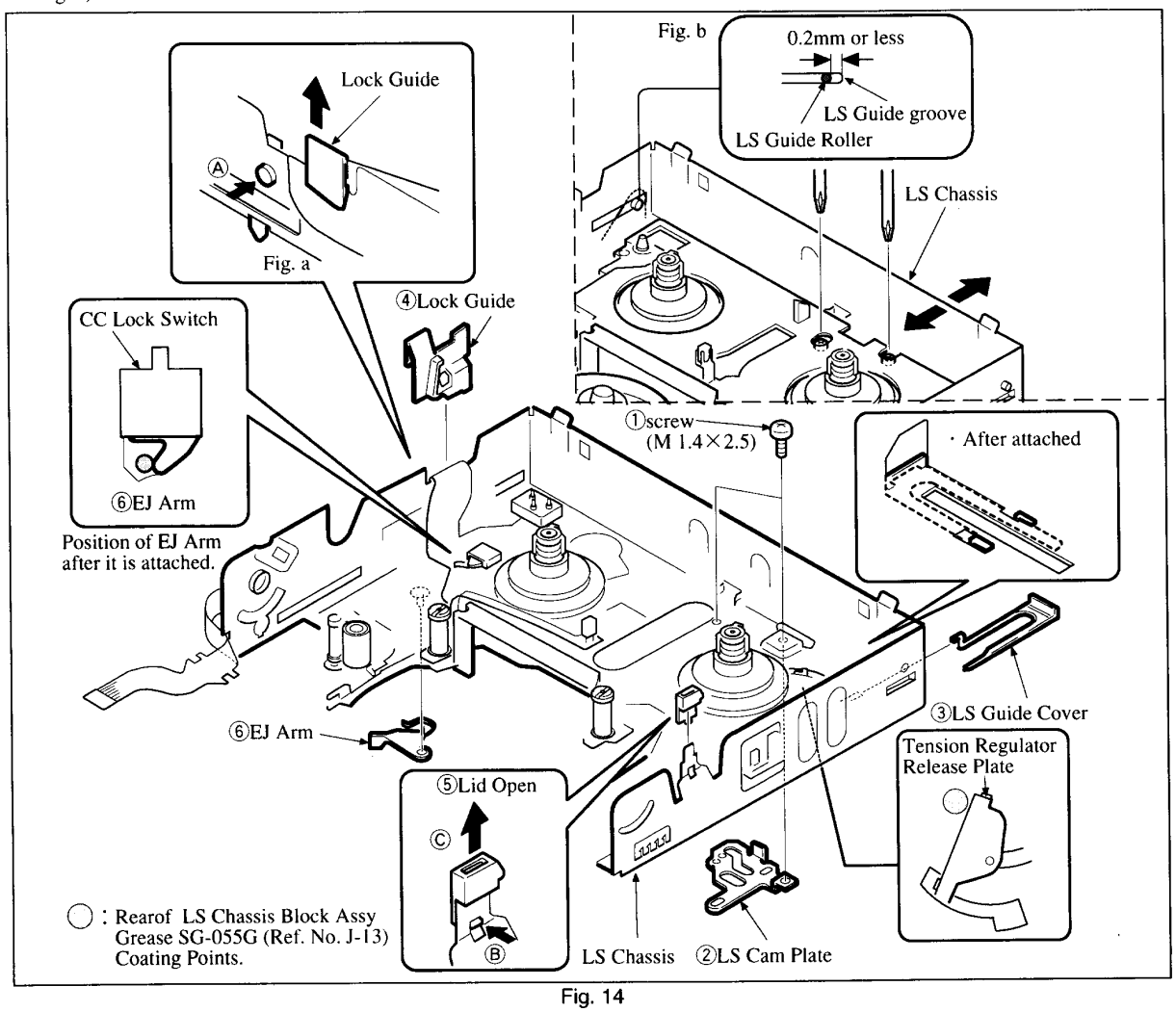


Fig. 14

3-10. Guide Base (S) and (T) Block Assemblies, Guide Rail (Refer to Fig. 15)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
3) Remove the LS Chassis Block Assy referring to section 3-5.
4) While pushing the GB Stoppers (S) and (T) in the direction of arrow Ⓐ, press the guide arm in the direction of the arrow Ⓑ, and turn the Guide Base (S) and (T) Block Assemblies : ① and ② in the direction of the arrow Ⓒ respectively, and remove them.
5) Remove the two screws (M 1.4×2.5) ③ and remove the the Guide Rail Assy ④.
6) Remove the Stopper (S) and (T) : ⑤ and ⑥, then remove the GB Stopper S and T: ⑦ and ⑧.

2. Precautions During Re-Assembly

1) Pay attention not to deform the Guide Rail.
2) Do not touch the tape guide of the Guide Base (S) and (T) Block Assemblies with bare hand.
3) Pay attention not to deform the Stoppers (S) and (T).
4) When attaching the Guide Base (S) and (T) Blocks to the Guide Rail, move back the Guide Bases until the GB Stoppers (S) and (T) are locked. ("Click" sounds.)
5) After the captioned parts are attached, perform section "4. TAPE PATH ADJUSTMENT".

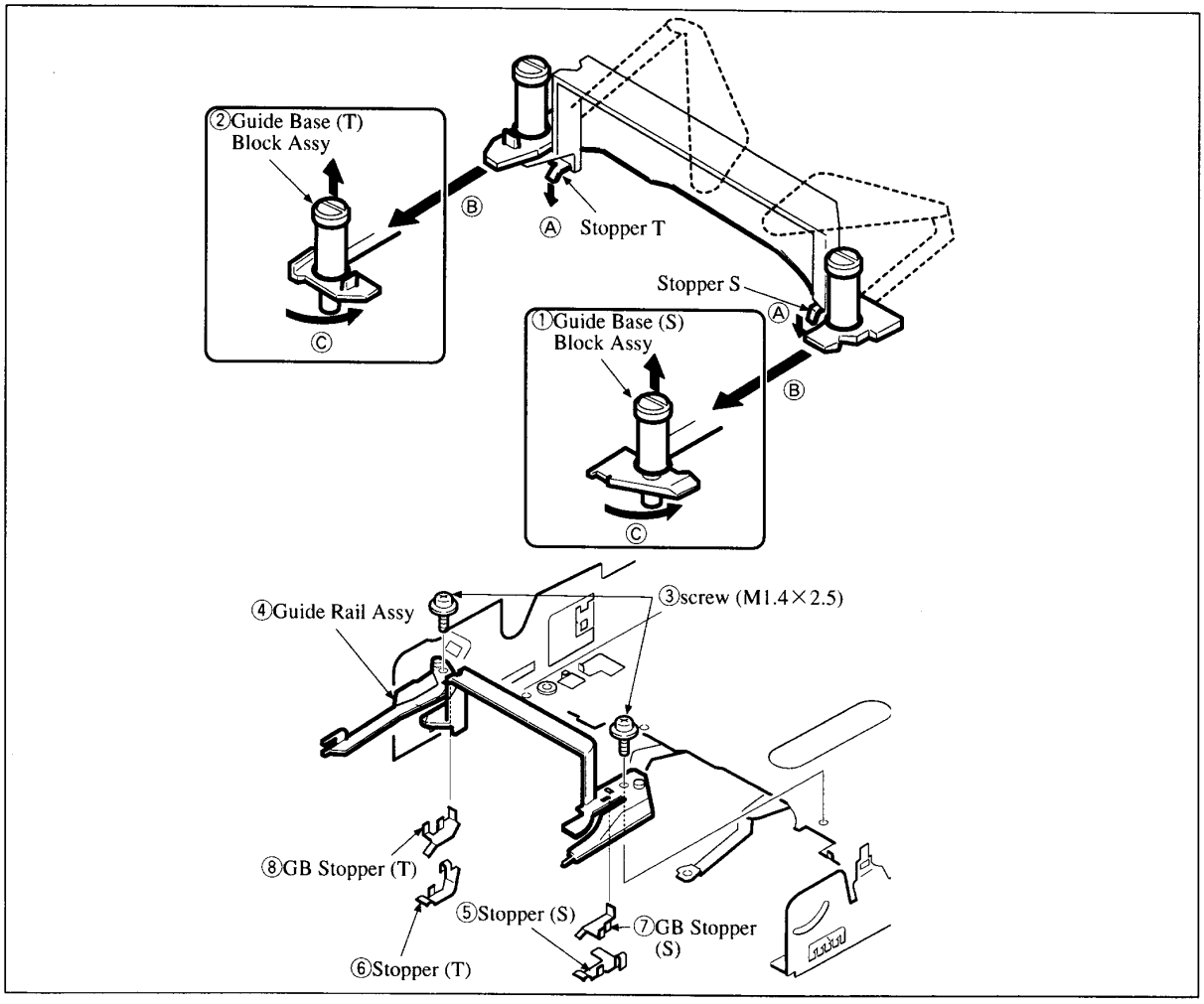


Fig. 15

- **PARTS CONSTITUTING THE MECHANISM CHASSIS**

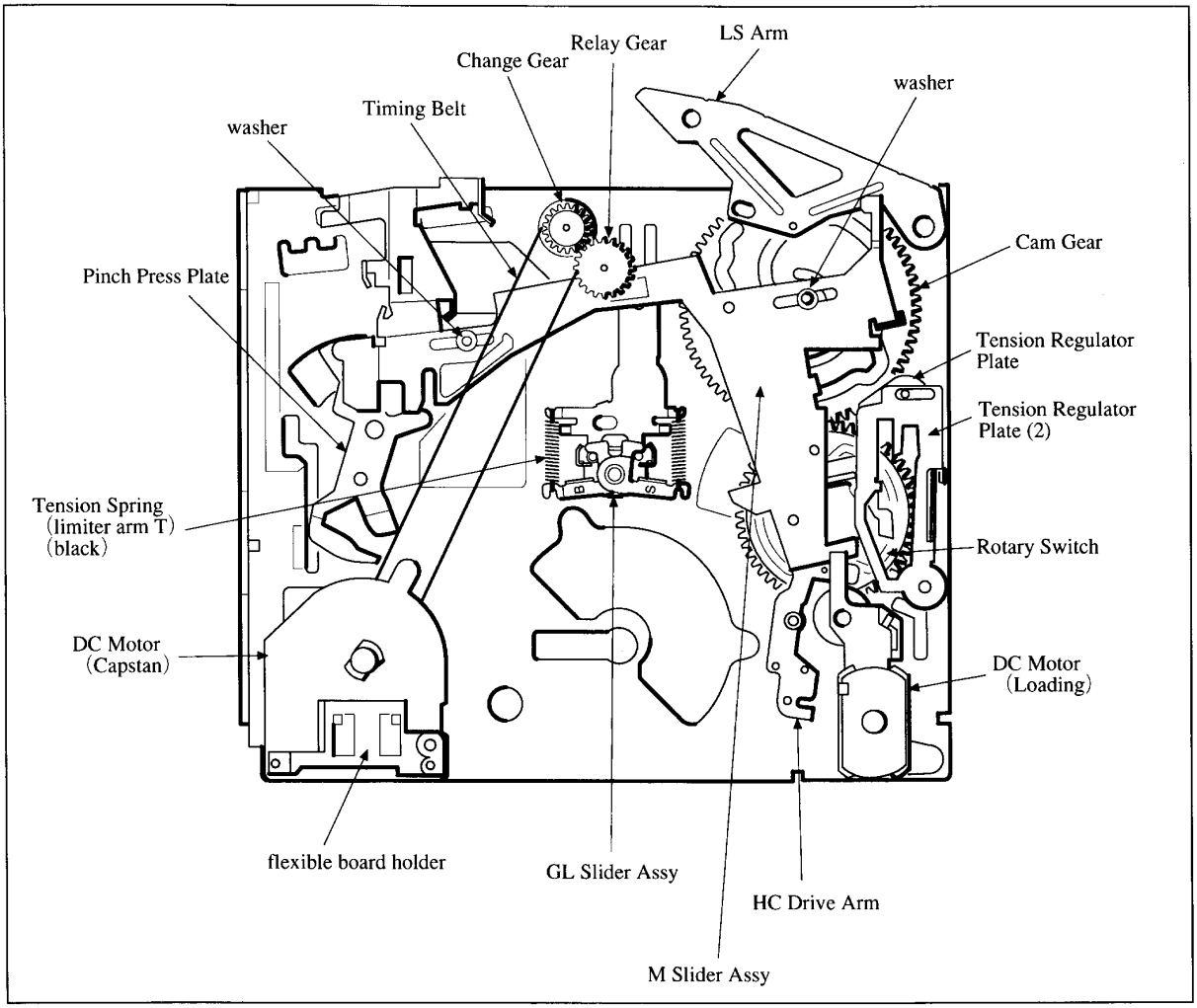


Fig.16

3-11. DC Motor Assy (Loading)
(Refer to Fig. 17)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the HC Roller Block Assy referring to section 3-1.
3) Remove the Drum Assy referring to section 3-2.
4) Remove the Drum Base Block Assy referring to section 3-3.
5) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
6) Remove the LS Chassis Block Assy referring to section 3-5.
7) Remove soldering from the Ⓐ portion.
8) Remove the screw (M 1.4×2.5) ① and remove the Motor Holder Block Assy ② from the mechanism chassis along with the claw beneath the Motor Holder Block Assy as shown by the arrow Ⓑ.
9) Remove the Motor Shield ③ in the direction of the arrow Ⓒ (by opening the two ★ star marked points).
10) Release the claw on top of the Motor Holder ⑤ and remove the DC Motor Assy ④ in the direction of the arrow Ⓓ.
11) Remove the Motor Holder Sleeve ⑥, Gear A⑦ and Worm Shaft ⑧ in this order.

2. Precautions During Re-Assembly

1) Before attaching the Gear A ⑥, coat the Retainer Shaft Ⓔ with grease SG-055G (Ref. No. J-13).
2) After assembling the Motor Holder Block Assy, coat the six locations shown by Fig. a with grease SG-055G (Ref. No. J-13).
3) The HC Drive Arm is easy to drop. Confirm that it is attacked referring to Fig. 19.

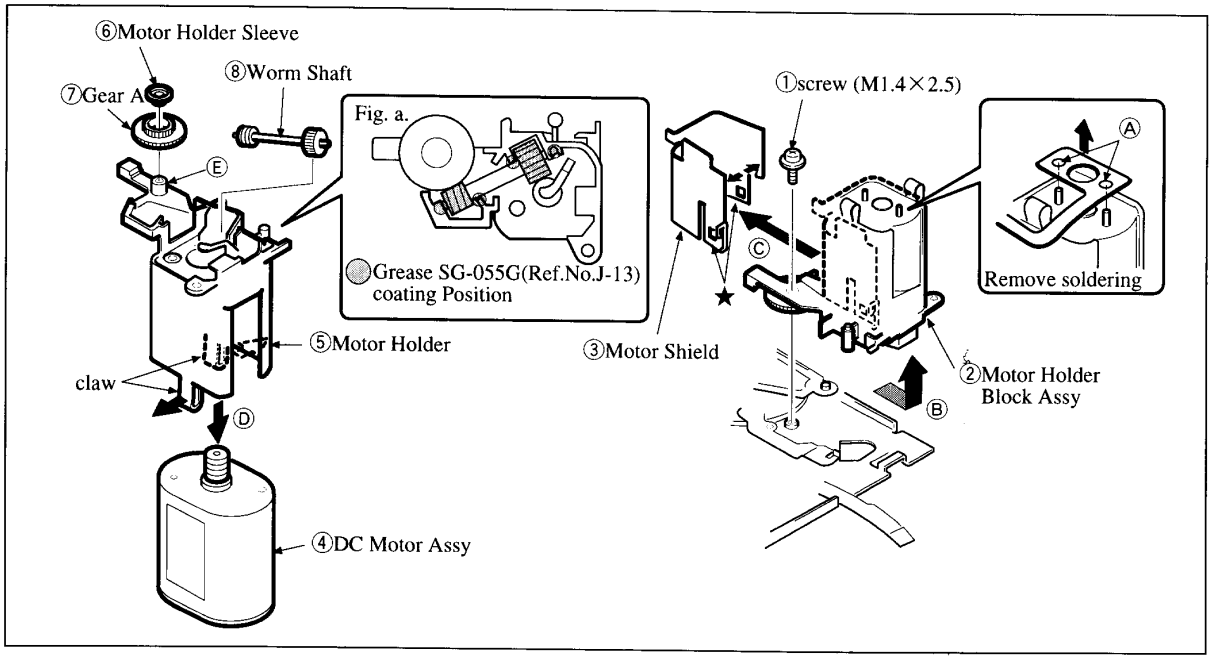


Fig. 17

3-12. Tension Regulator Plate 2, Relay Gear, M Slider Assy (Refer to Fig. 18)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the HC Roller Block Assy referring to section 3-1.
3) Remove the Drum Assy referring to section 3-2.
4) Remove the Drum Base Block Assy referring to section 3-3.
5) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
6) Remove the LS Chassis Block Assy referring to section 3-5.
7) Remove the DC motor referring to section 3-11.
8) Remove the Tension Regulator Plate 2 ①.
9) Remove the Relay Gear ②.
10) Remove the two washers ③. Remove the M Slider Assy ④. At the point, confirm that the LS Roller ⑤ is not dropped.

2. Precautions During Re-Assembly

1) Before attaching the M Slider Assy ④, coat the LS Roller Shaft Ⓐ on the back of the M Slider Assy, the Pinch Press Plate Shaft Ⓑ and the mechanism chassis M Slider Axis Ⓒ with grease SG-055G (Ref. No. J-13). (Refer to Fig. b)
2) While confirming the phase-determining holes, attach the M Slider Assy ④ while paying attention to the claw.
3) Attach the Tension Regulator Plate 2 ① inside the Tension Regulator Plate. (Refer to the asterisk * Marked portion of Fig. a)
4) Before attaching the Relay Gear ②, coat the mechanism chassis Relay Gear Axis Ⓓ with grease SG-055G (Ref. No. J-13).

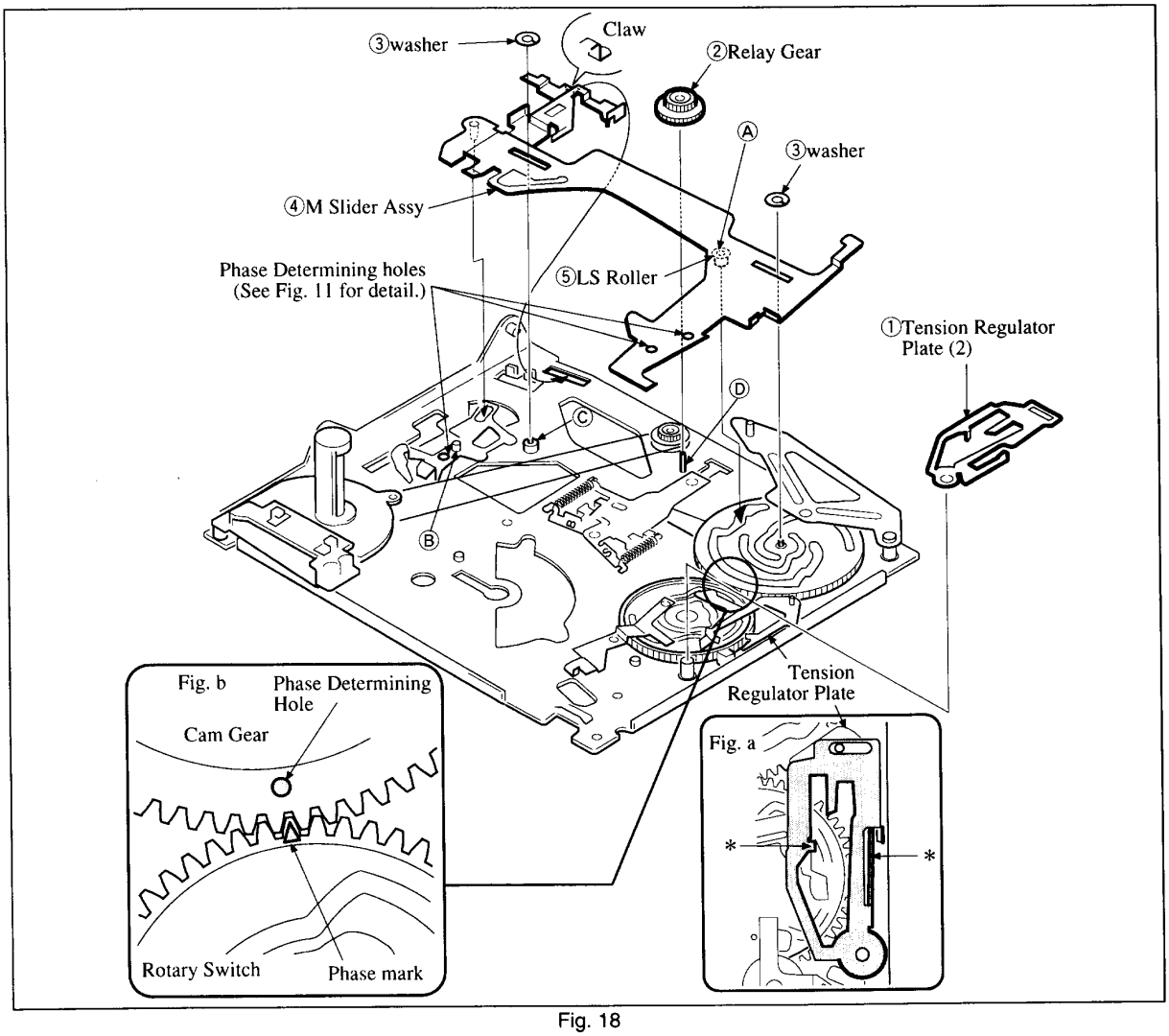


Fig. 18

3-13. LS Arm, HC Drive Arm, Pinch Press Plate, Tension Regulator Plate (Refer to Fig. 19)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the HC Roller Block Assy referring to section 3-1.
3) Remove the Drum Assy referring to section 3-2.
4) Remove the Drum Base Block Assy referring to section 3-3.
5) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
6) Remove the LS Chassis Block Assy referring to section 3-5.
7) Remove the DC Motor Assy referring to section 3-11.
8) Remove the Tension Regulator Plate 2, Relay Gear and M Slider Assy referring to section 3-12.
9) Remove the LS Arm ①. At this point, confirm that the LS Roller ② is not dropped.
10) Remove the HC Drive Arm ③, Pinch Press Plate ④ and Tension Regulator Plate ⑤.

2. Precautions During Re-Assembly

1) Before attaching the captioned parts, confirm that phases of the Cam Gear and the Rotary Switch agree. (See Fig. a.)
2) Insert the dowel of the Tension Regulator Plate ⑤ into the groove outside the rotary switch.
3) Before attaching the Pinch Press Plate ④, check for grease on the mechanism chassis Pinch Press Plate Shaft Ⓐ. If grease cannot be found, coat it with grease SG-055G (Ref. No. J-13). After attaching the Pinch Press Plate ④, align its phase hole until it agrees with the phase-determining hole on the mechanism chassis.
4) Insert the dowel of the HC Drive Arm ③ into the groove inside the rotary switch.
5) Before attaching the LS Arm ①, coat the LS roller shaft of the LS Arm ① with grease SG-055G (Ref. No. J-13).

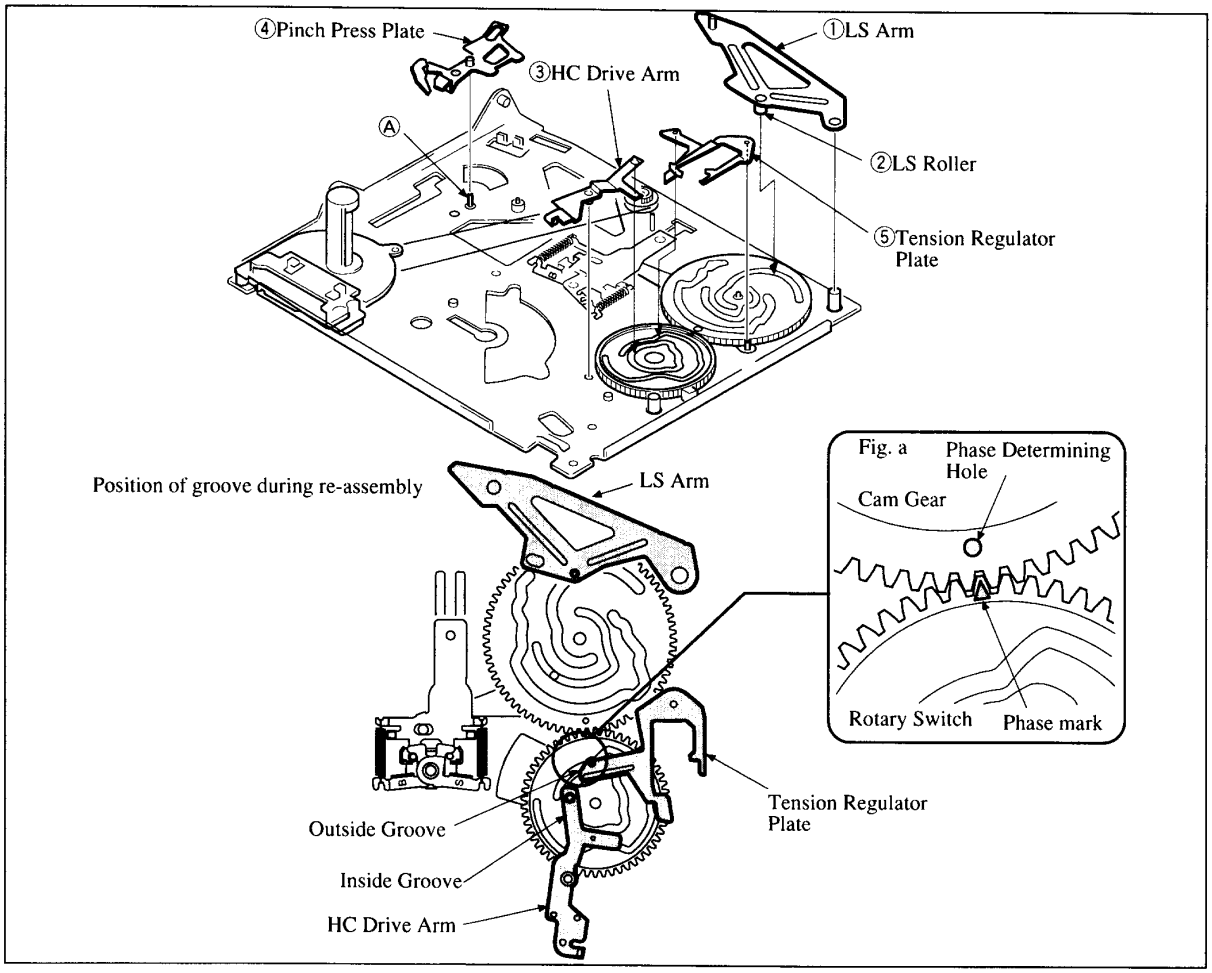


Fig. 19

3-14. Cam Gear (Refer to Fig. 20)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the HC Roller Block Assy referring to section 3-1.
3) Remove the Drum Assy referring to section 3-2.
4) Remove the Drum Base Block Assy referring to section 3-3.
5) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
6) Remove the LS Chassis Block Assy referring to section 3-5.
7) Remove the DC Motor Assy referring to section 3-11.
8) Remove the Tension Regulator Plate 2, Relay Gear and M Slider Assy referring to section 3-12.
9) Remove the LS Arm and Tension Regulator Plate referring to section 3-13.
10) Remove the Cam Gear ①.

2. Precautions During Re-Assembly

1) Before attaching the Cam Gear ①, align the phase mark on the rotary switch until it agrees with the phase-determining hole Ⓐ on the mechanism chassis, and align the GL Arm's phase mark Ⓑ until it agrees with the phase-determining hole Ⓐ on the mechanism chassis. Coat the mechanism's chassis Gear Axis Ⓐ with grease SG-055G (Ref. No. J-13).
2) Attach the Cam Gear ① so that its phase hole agrees with the phase mark on the rotary switch. (Refer to Fig. a)
3) After the Cam Gear ① is attached, coat the GL Arm Axis Block of the cam gear with grease SG-055G (Ref. No. J-13).

Reference : The phase marks of the Cam Gear and Rotary Switch can also be checked from the rear side of mechanism chassis. It means that the phase can be confirmed after mechanism deck is fully re-assembled.

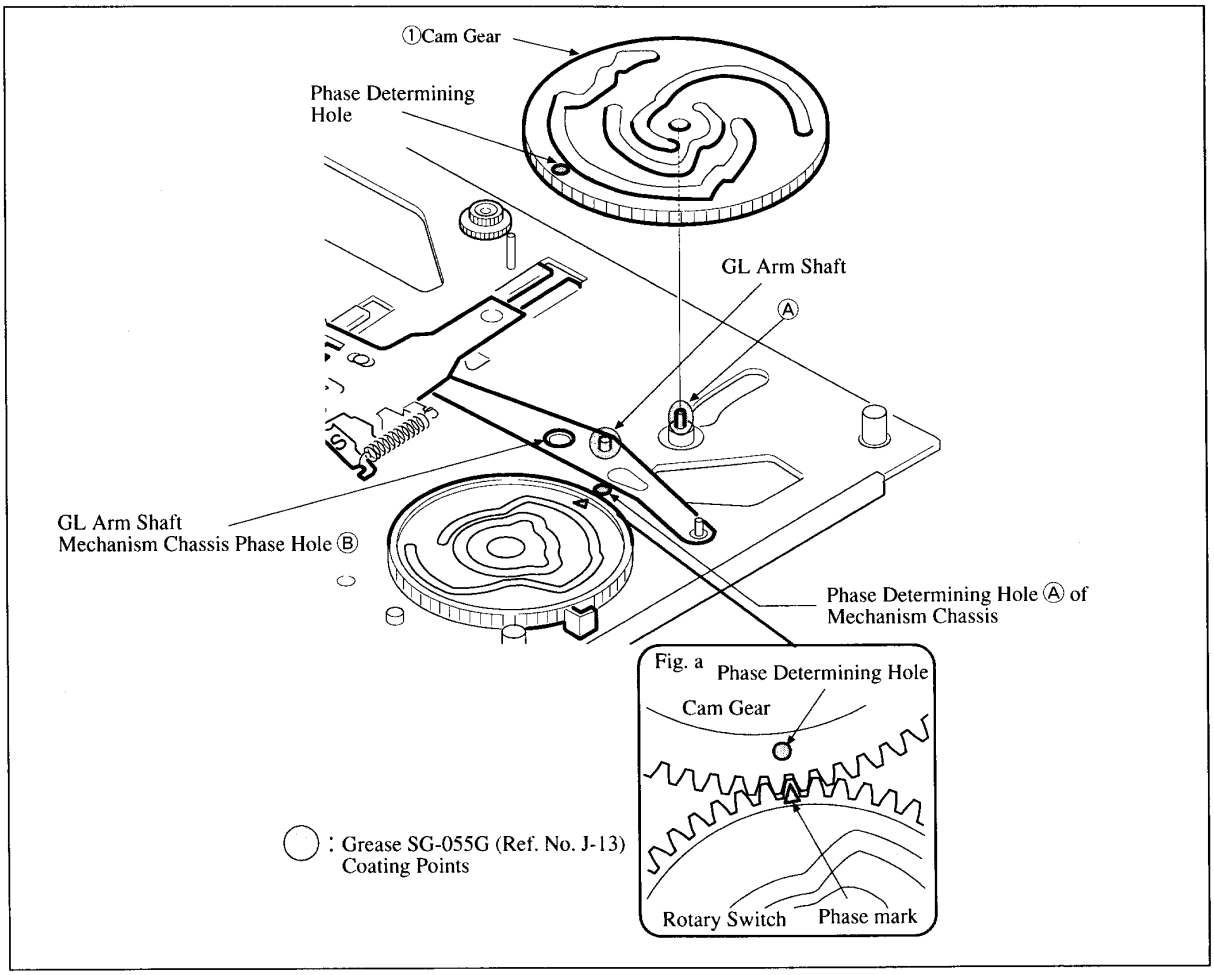


Fig. 20

3-15. GL Slider Assy, GL Arm (Refer to Fig. 21)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the HC Roller Block Assy referring to section 3-1.
3) Remove the Drum Assy referring to section 3-2.
4) Remove the Drum Base Block Assy referring to section 3-3.
5) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
6) Remove the LS Chassis Block Assy referring to section 3-5.
7) Remove the DC Motor Assy referring to section 3-11.
8) Remove the Tension Regulator Plate 2, Relay Gear and M Slider Assy referring to section 3-12.
9) Remove the LS Arm and Tension Regulator Plate referring to section 3-13.
10) Remove the Cam Gear referring to section 3-14.
11) Remove the GL Slider Assy ① by sliding it in the direction of the arrow Ⓐ.
12) Remove the GL Arm ②.

2. Precautions During Re-Assembly

1) The Tension Spring T③ is colored black and the Tension Spring S④ is colored silver.
2) Coat the position shown in Fig. a of the GL Slider Assy ① with grease SG-055G (Ref. No. J-13).
3) Coat the four points Ⓑ where GL slider is attached on the mechanism chassis with grease SG-055G (Ref. No. J-13).
4) After attaching the GL Arm ② and the GL Slider Assy, align the GL arm phase hole until it agrees with the phase-determining hole on the mechanism chassis.

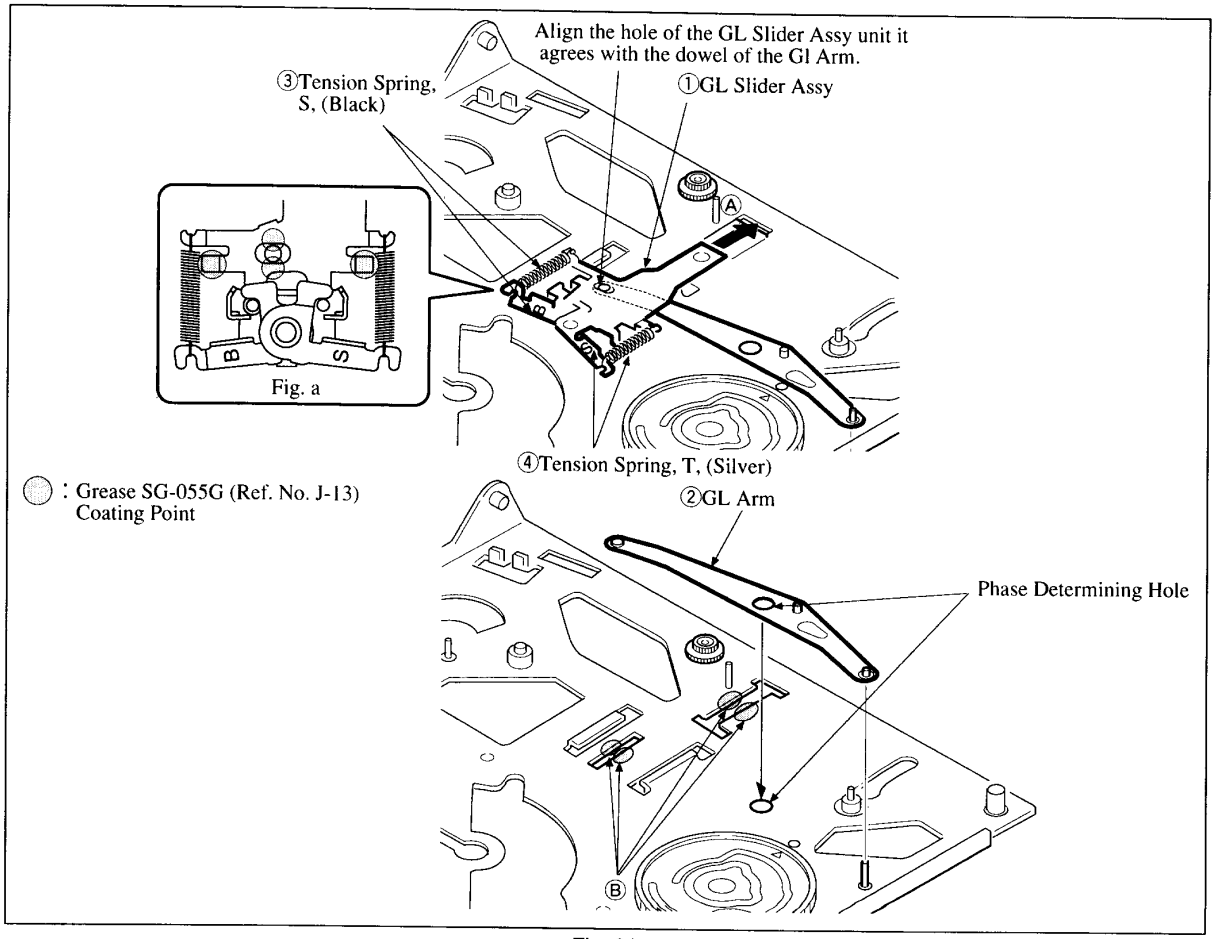

Align the hole of the GL Slider Assy unit it agrees with the dowel of the Gl Arm.
③Tension Spring, S, (Black)
①GL Slider Assy
Ⓐ
Fig. a
④Tension Spring, T, (Silver)
: Grease SG-055G (Ref. No. J-13) Coating Point
②GL Arm
Phase Determining Hole
Ⓑ

Fig. 21

3-16. Rotary Switch (Refer to Fig. 22)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the HC Roller Block Assy referring to section 3-1.
3) Remove the Drum Assy referring to section 3-2.
4) Remove the Drum Base Block Assy referring to section 3-3.
5) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
6) Remove the LS Chassis Block Assy referring to section 3-5.
7) Remove the DC Motor Assy referring to section 3-11.
8) Remove the Tension Regulator Plate 2, Relay Gear and M Slider Assy referring to section 3-12.
9) Remove the LS Arm, Tension Regulator Plate, HC Drive Arm and Pinch Press Plate referring to section 3-13.
10) Remove the Cam Gear referring to section 3-14.
11) Remove soldering the portion Ⓐ on the rear of the Rotary Switch. (Pay attention at this moment that the GL Slider and GL Arm do not drop.)
12) While lifting up the portion Ⓑ about 1 mm (pay attention not to break it), hold the portion Ⓒ and turn it in the direction of the arrow Ⓓ to remove the Rotary Switch.

2. Precautions During Re-Assembly

1) Before attaching the Rotary Switch by soldering on the FP-220 board, insert the portion Ⓑ dowel into the hole on the mechanism chassis. Confirm that the three claws are engaged with the mechanism chassis.

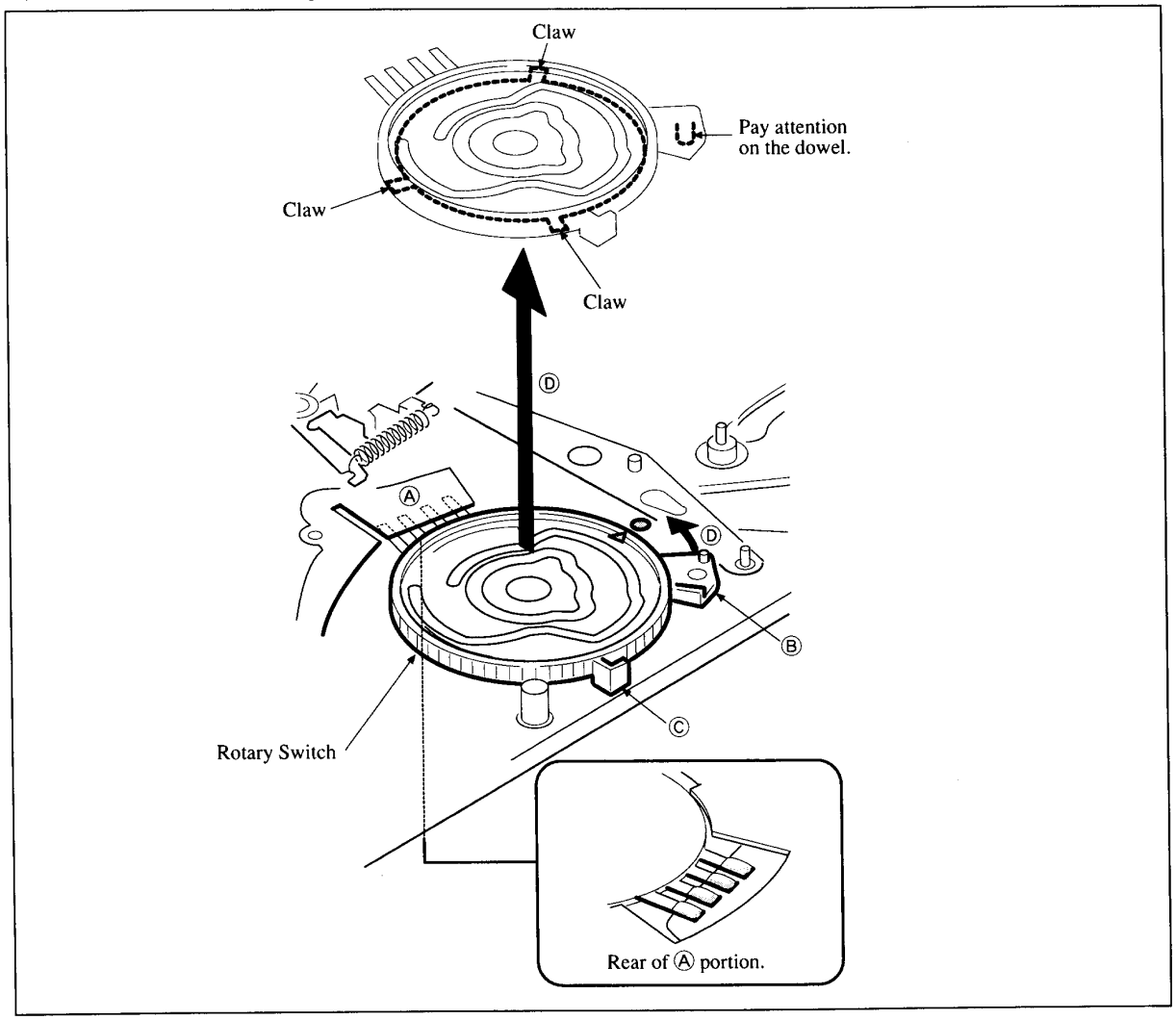


Fig. 22

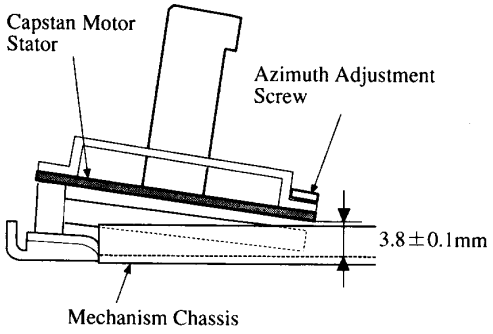
3-17. Capstan Motor (Refer to Fig. 23)

1. Disassembly Procedure

1) Remove the Cassette Compartment Block Assy referring to section 1-1.
2) Remove the HC Roller Block Assy referring to section 3-1.
3) Remove the Drum Assy referring to section 3-2.
4) Remove the Drum Base Block Assy referring to section 3-3.
5) Remove the Gooseneck Retainer and Gooseneck Gear Assy referring to section 3-4.
6) Remove the LS Chassis Block Assy referring to section 3-5.
7) Remove the DC Motor Assy referring to section 3-11.
8) Remove the Tension Regulator Plate 2, Relay Gear and M Slider Assy referring to section 3-12.
9) Remove the Pinch Press Plate referring to section 3-13.
10) Remove the screw (M 1.4×6.7) ① and remove the Flexible Board Holder ②.
11) Remove the two screws (M 1.4×6.7) ③ and remove the Capstan Motor ④, Timing Belt ⑤ and Capstan Spacer ⑥.
12) Remove the washer ⑦ and remove the Changer Gear ⑧.

2. Precautions During Re-Assembly

1) Confirm that the timing belt is not twisted.
2) Do not touch the capstan with bare hand.
3) Lubricate the mechanism chassis's Change Gear shaft Ⓐ.
4) After attaching the Capstan Motor, perform the capstan azimuth adjustment.



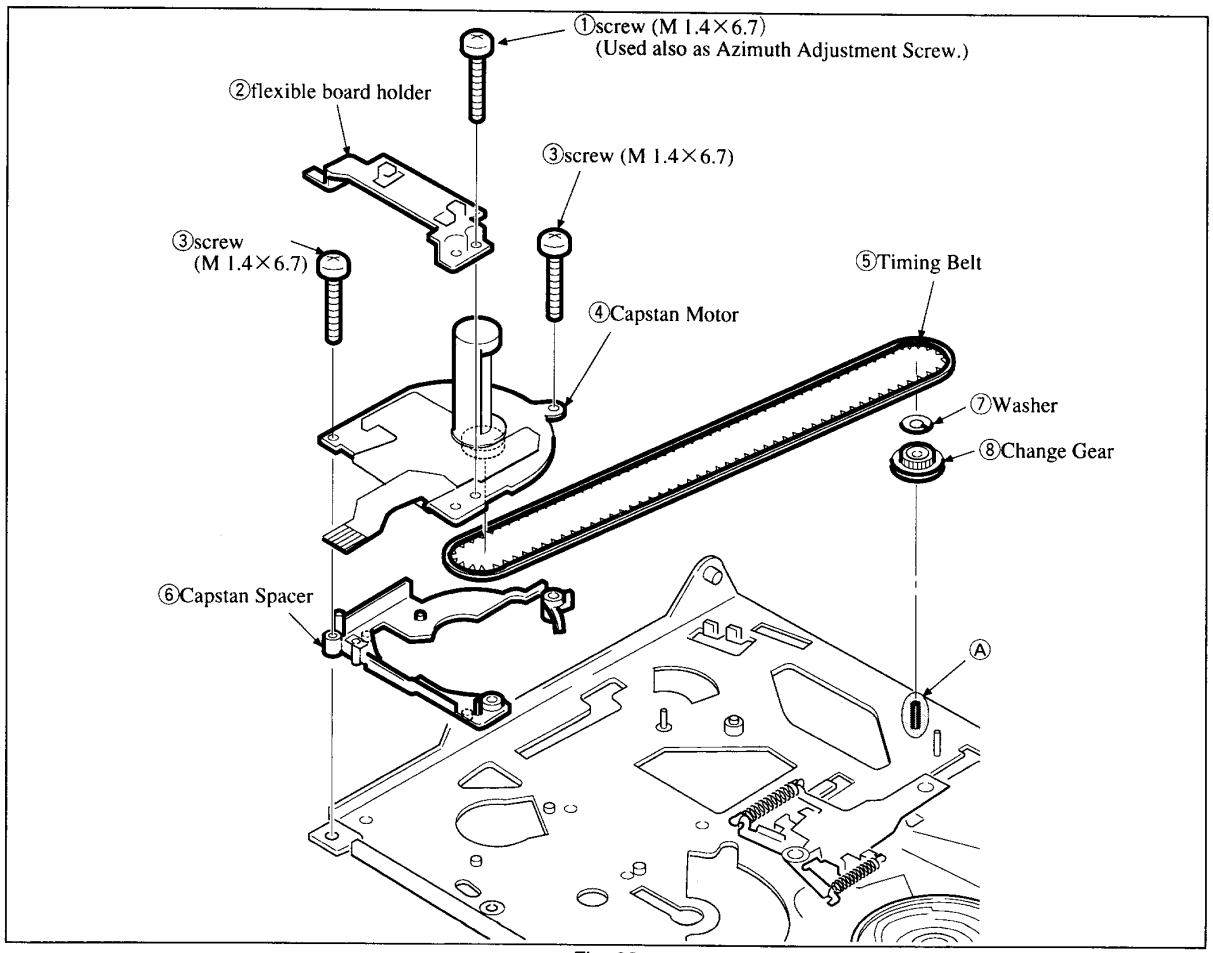


Fig. 23

3-18. Tension Regulator Position Adjustment (Refer to Fig.24)

1. Adjustment Procedure

1) Insert a cassette Tape and run the Tape in PB mode.
2) While tape is running, confirm that the distance between the LS Chassis and TG-1 Guide's top flange is 8.3mm.
3) If not, proceed to step 4).
4) Loosen the screw ① (M 1.4×3).
5) If the TG-1 Guide is located inside the specified position, move position of the Tension Regulator Band Assy using the FWD B.T. Adjustment tool screwdriver (Ref. No. J-9) as shown in the direction of the arrow Ⓐ. If it is located outside, move it in the direction of the arrow Ⓑ.
6) Tighten the screw ① (M 1.4×3).

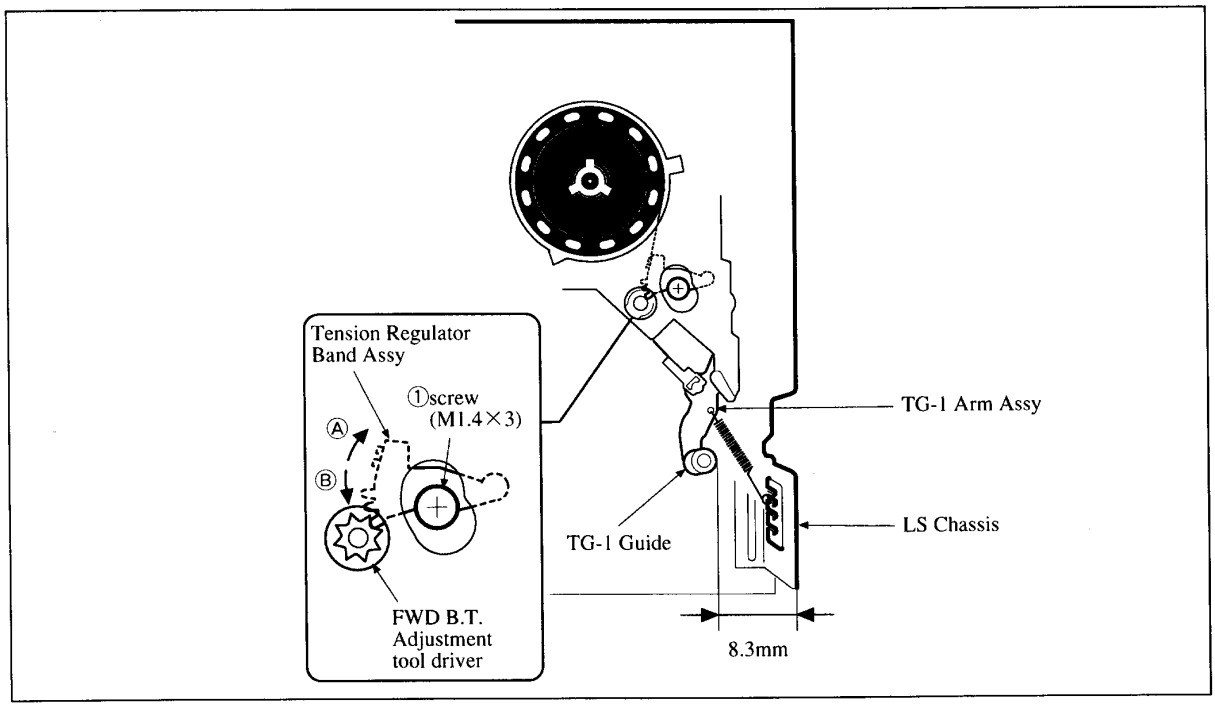


Fig.24

3-19. FWD Tape Hold-Back Tension Adjustment (Refer to Fig. 25)

1. Adjustment Procedure

1) Insert the torque measurement cassette to the machine.
2) Put the machine in the FWD mode. Confirm that the reading on the S side is in the range from 8.0 to 10.5 g•cm. If the reading is outside the specification range, make the following adjustments.
3) If the reading is higher than the specification, change the TG-1 Tension Spring to the side Ⓐ.
4) If the reading is lower than the specification, change the TG-1 Tension Spring to the side Ⓑ.

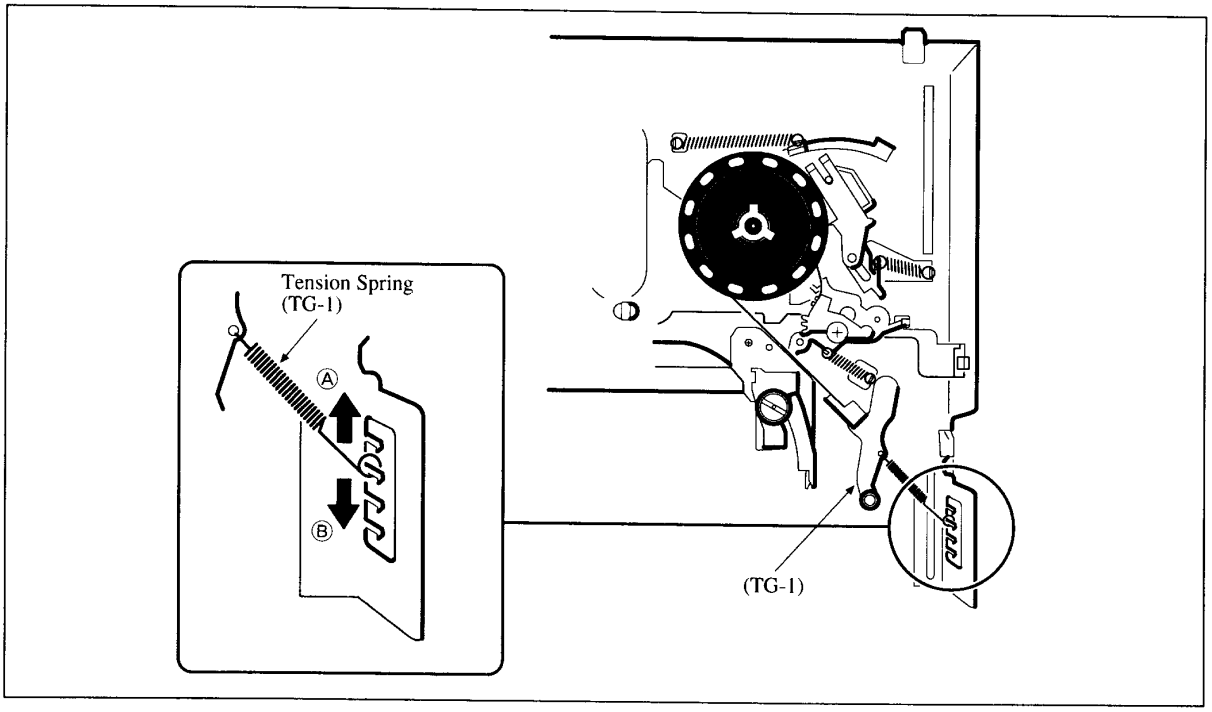


Fig. 25

4. TAPE PATH ADJUSTMENT

Purpose: Adjusts the head linearity.

Adjustment Error: Noise appears on top and bottom of display when playing back the tape recorded by other machines.

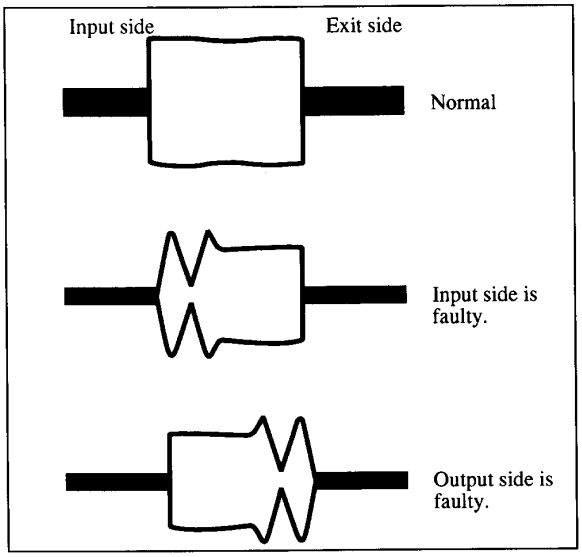


Fig. 26

4-1. Preparations for Adjustments

1) Clean the tape running surface (tape guide, drum, capstan, pinch roller).
2) Connect the adjustment remote commander to the REMOTE terminal (JACK block).
3) Establish the PATH mode using the adjustment remote commander (Track Shift mode)* to cancel auto tracking.
4) Connect an oscilloscope.
   CH1: Test connector PB RF terminal
   External trigger: Test connector PB SWP terminal
5) Playback the tracking alignment tape WR5-1NP (NTSC) or WR5-1CP (PAL) (Ref. No. J-6).
6) Check to see that RF waveform is flat at input and exit sides on oscilloscope.
   If it not flat, perform the following section 4-2 until it is flat.
7) After completing the adjustment, release the PATH mode (Track Shift mode).*.

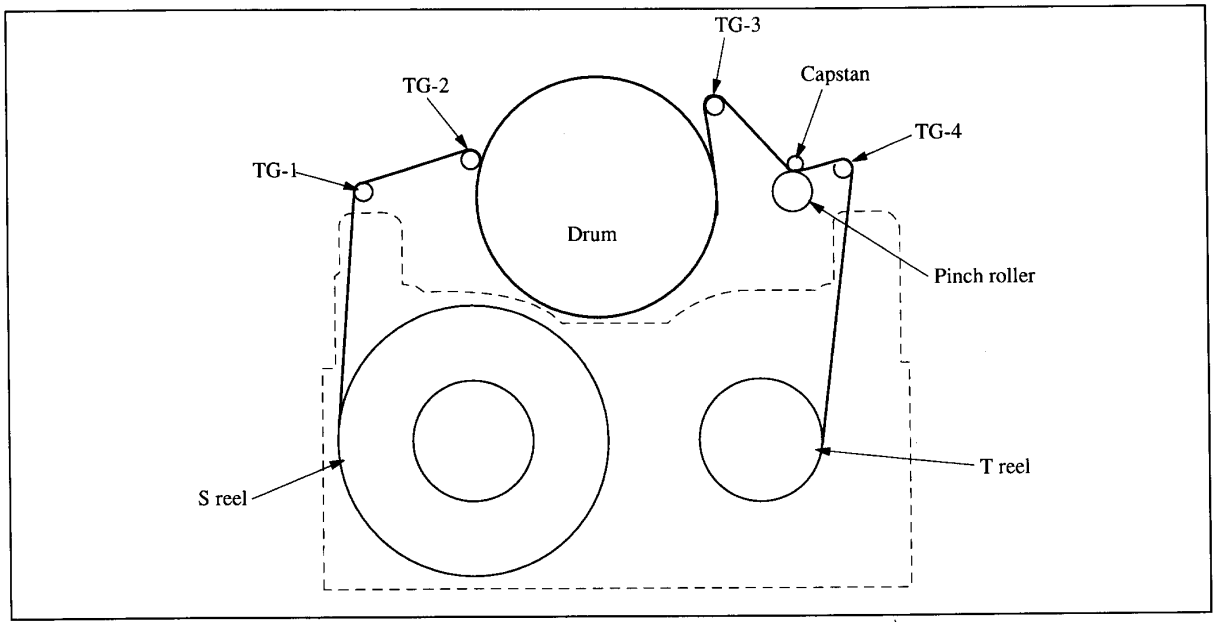


Fig. 27

* How to enter and exit the Track Shift mode. (In the case of CCD-TR420E/TR440E)

Entering the Track Shift mode

1. Select page : 6, address : 00 set data : 01 and press the PAUSE button.
2. Select page : 7, address : 01 set data : 03 and press the PAUSE button.

Exitting the Track Shift mode

1. Select page : 7, address : 01 set data : 00 and press the PAUSE button.
2. Select page : 6, address : 00 set data : 00 and press the PAUSE button.

4-2. Tracking Adjustment (Refer to Fig. 28.)

1) Playback the tracking alignment tape WR5-1NP (NTSC) or WR5-1CP (PAL) (Ref. No. J-6).
2) Adjust the tape guide No. 2 until the input side waveform becomes flat.
3) Adjust the tape guide No. 3 until the input side waveform becomes flat.

☆ Zenith adjustment screws for the TG-2 and TG-3 do not need to be adjusted.

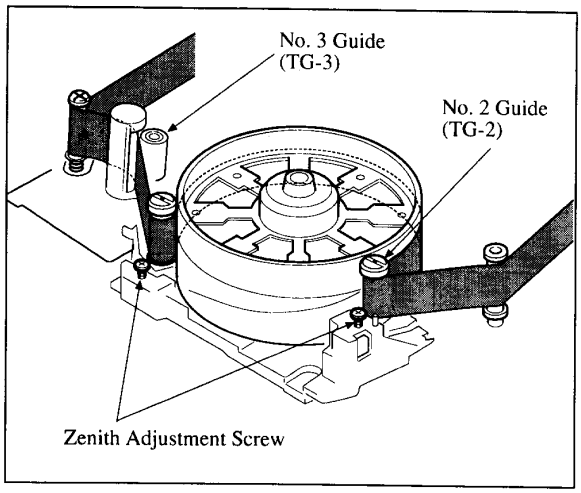


Fig. 28

4-3. No. 4 Guide (TG-4) Adjustment (Refer to Fig. 29.)

1) Playback a tape in REV mode.
2) Confirm that tape slack does not occur in between the guide No. 3 (TG-3) ① and Capstan ②. If tape slack is found, turn the height adjustment screw ④ of the Guide No. 4 (TG-4) ③ until tape slack is removed.
3) Playback a tape in FWD mode. Confirm that tape slack does not occur in between the guide No. 4 (TG-4) ③ and capstan ②. (Specification = 0.5 mm or less) If tape slack of more than 0.5 mm is found, turn the TG-4 nut ④ until the slack is 0.5 mm or less. Playback tape in REV mode and confirm that tape slack in between the guide No. 3 (TG-3) ① and capstan ② is 0.3 mm or less, the adjustment is complete.

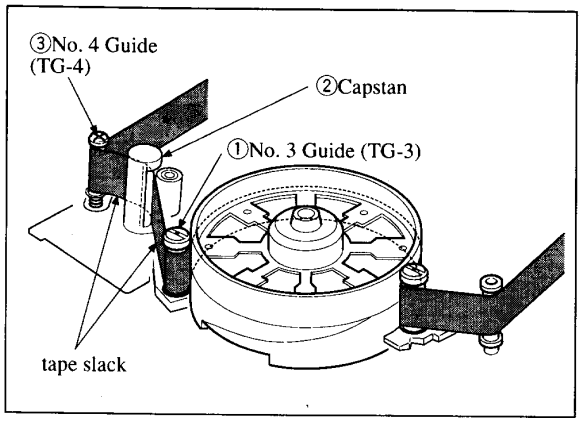


Fig. 29

4-4. CUE, REV Waveforms Check (Refer to Fig. 30.)

1) Playback the tracking alignment tape in REV mode.
   Confirm that pitches between the peaks of the waveform are equally spaced for 5 seconds or longer.
   The pitches are not equally spaced, perform sections "4-2. Tracking Adjustment" and section "4-3. No. 4 Guide Adjustment".
2) Playback the tracking alignment tape in CUE mode.
   Confirm that pitches between the peaks of the waveform are equally spaced for 5 seconds or longer.
   The pitches are not equally spaced, perform section "4-2. Tracking Adjustment".

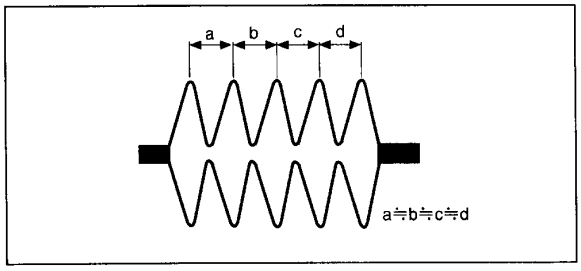


Fig. 30

4-5. Checks After Adjustments

4-5-1. Tracking Check

1) Confirm that amplitude of the RF waveform decreases to about 3/4 when the machine enters the PATH mode. (Refer to Fig. 31)
2) Confirm that the minimum amplitude (EMIN) of the RF waveform is 65 % or more of the maximum amplitude (EMAX). (Refer to Fig. 32)
3) Confirm that the RF waveform does not have too much fluctuation. (Refer to Fig. 33)

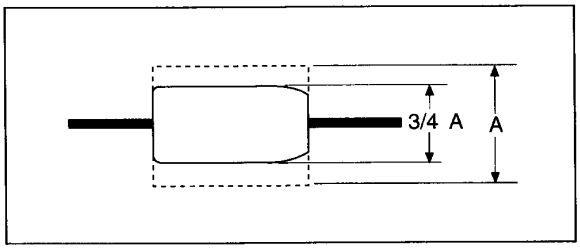


Fig. 31

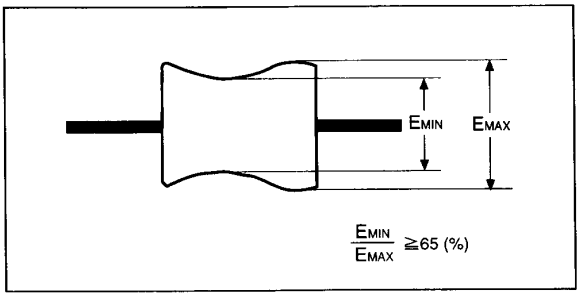


Fig. 32

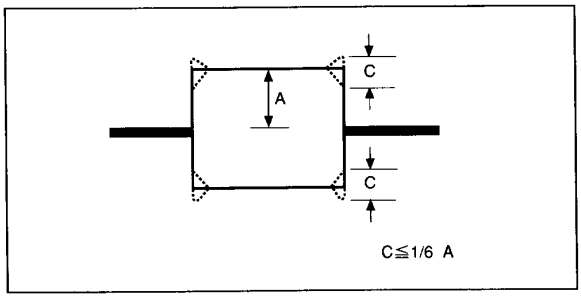


Fig. 33

4-5-2. Waveform Build-up Check (Refer to Fig. 34.)

1) Playback the tracking alignment tape.
2) Turn OFF the Track Shift mode.
3) Eject the tape once, insert and load the tape.
4) Start playing back the tape and confirm that the RF waveform builds up in three seconds with flat envelope. Confirm at this time that tape slack does not occur near pinch roller.
5) Playback the tape in CUE/REV and FF/REW modes respectively. Confirm that the RF waveform builds up in three seconds with flat envelope. Confirm at this time that tape slack does not occur near pinch roller.
6) Repeat the check items 3) to 5) again.

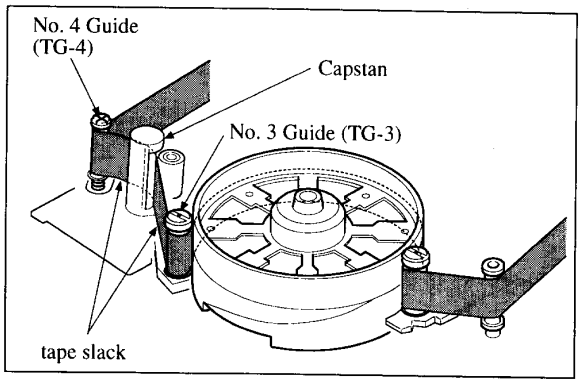


Fig. 34

4-5-3. Tape Pass Check (Refer to Fig. 35.)

1) Insert a thin video tape such as P6-120MP (NTSC) or P5-120MP (PAL). Playback the thin tape. Confirm that there is no clearance or curl of 0.3 mm or more at the following points: Upper flange of guide No. 2, upper flange of guide No. 3, upper and lower flanges of guide No. 4.
2) Confirm that there is no clearance or curl of 0.3 mm or more at each tape guide when the FF button is pressed from the playback mode to enter the CUE mode, and when the REW button is pressed from the playback mode to enter the REV mode.

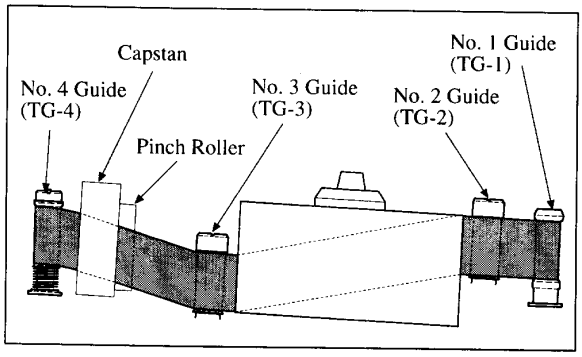
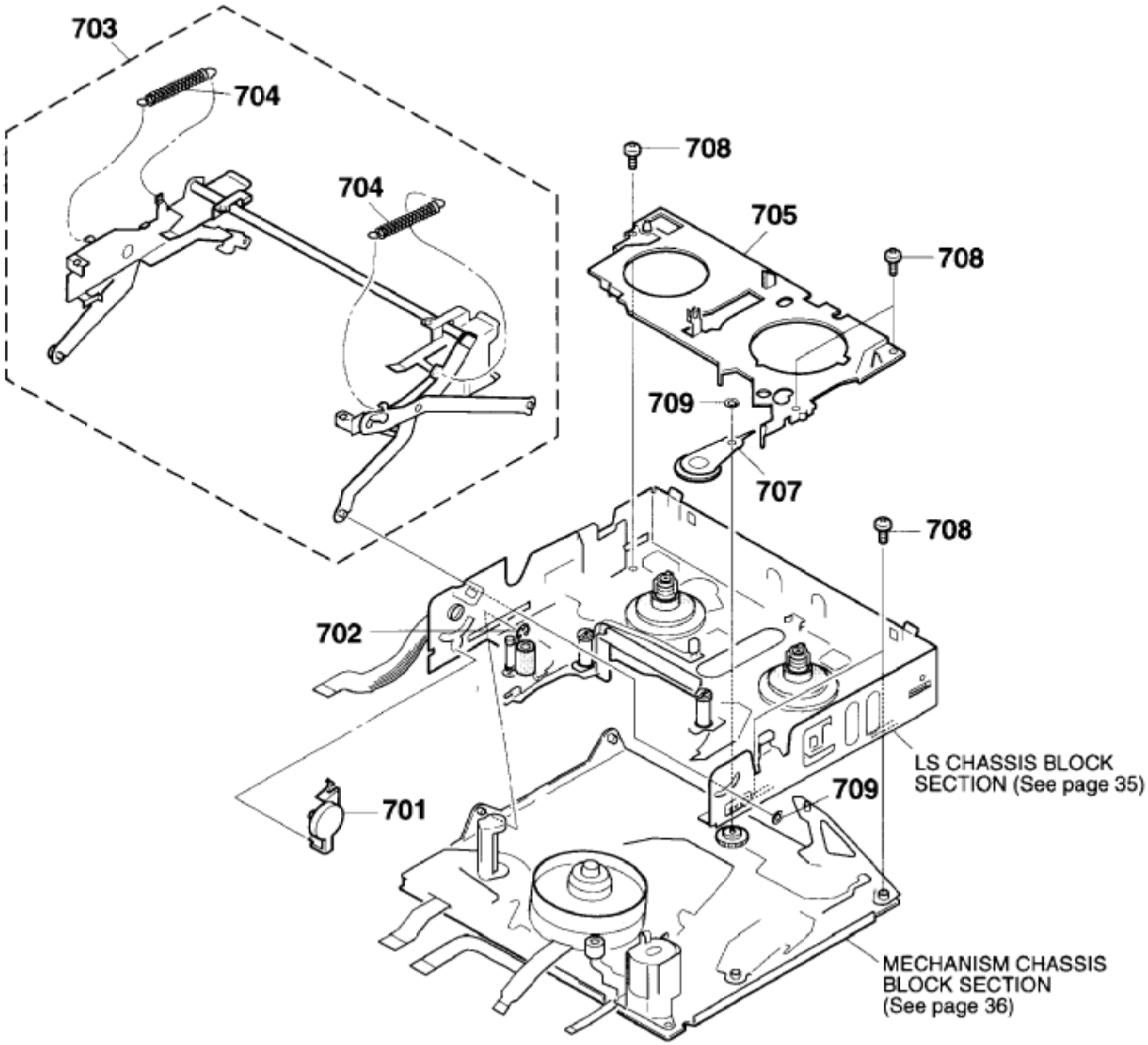
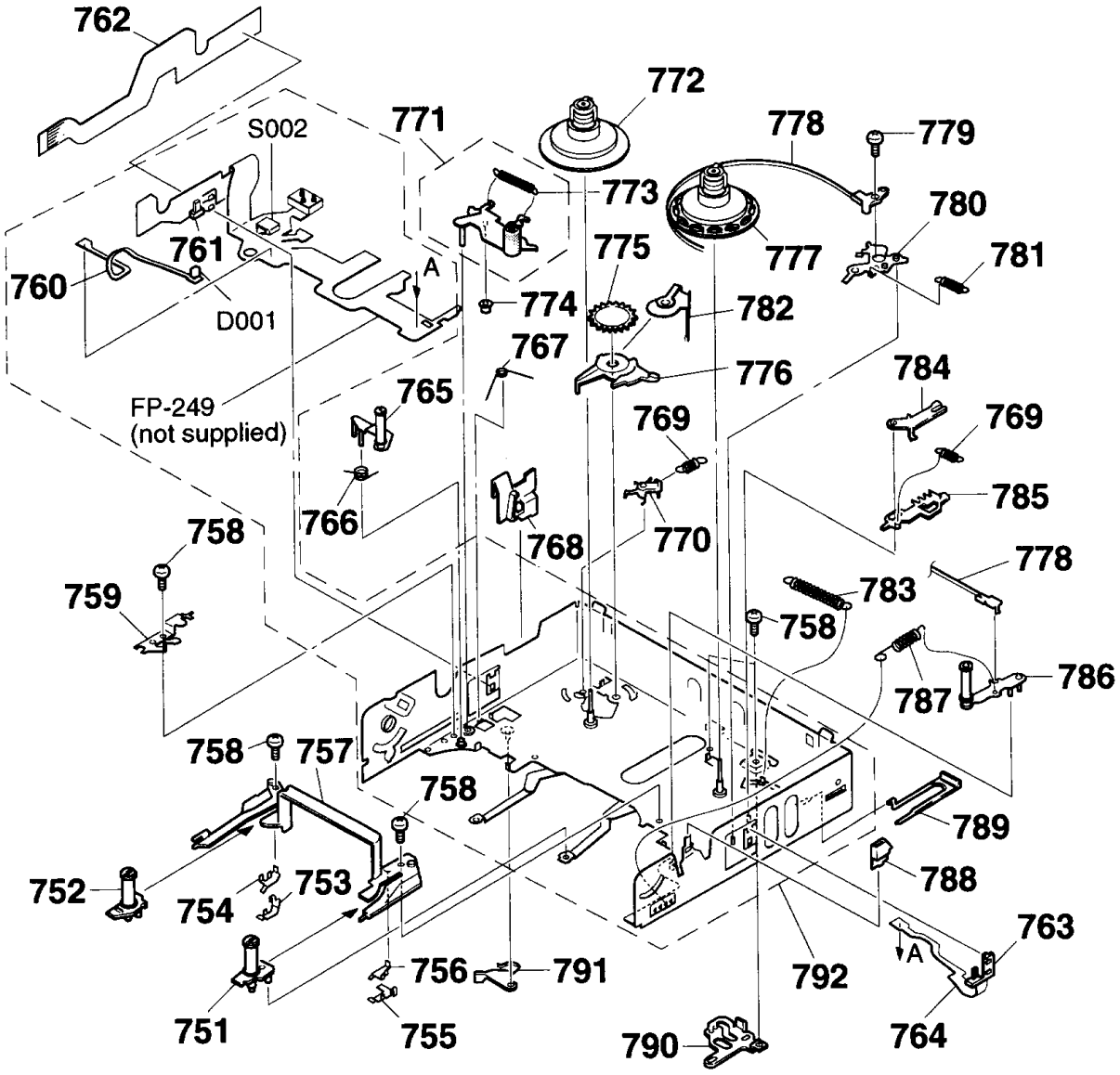


Fig. 35

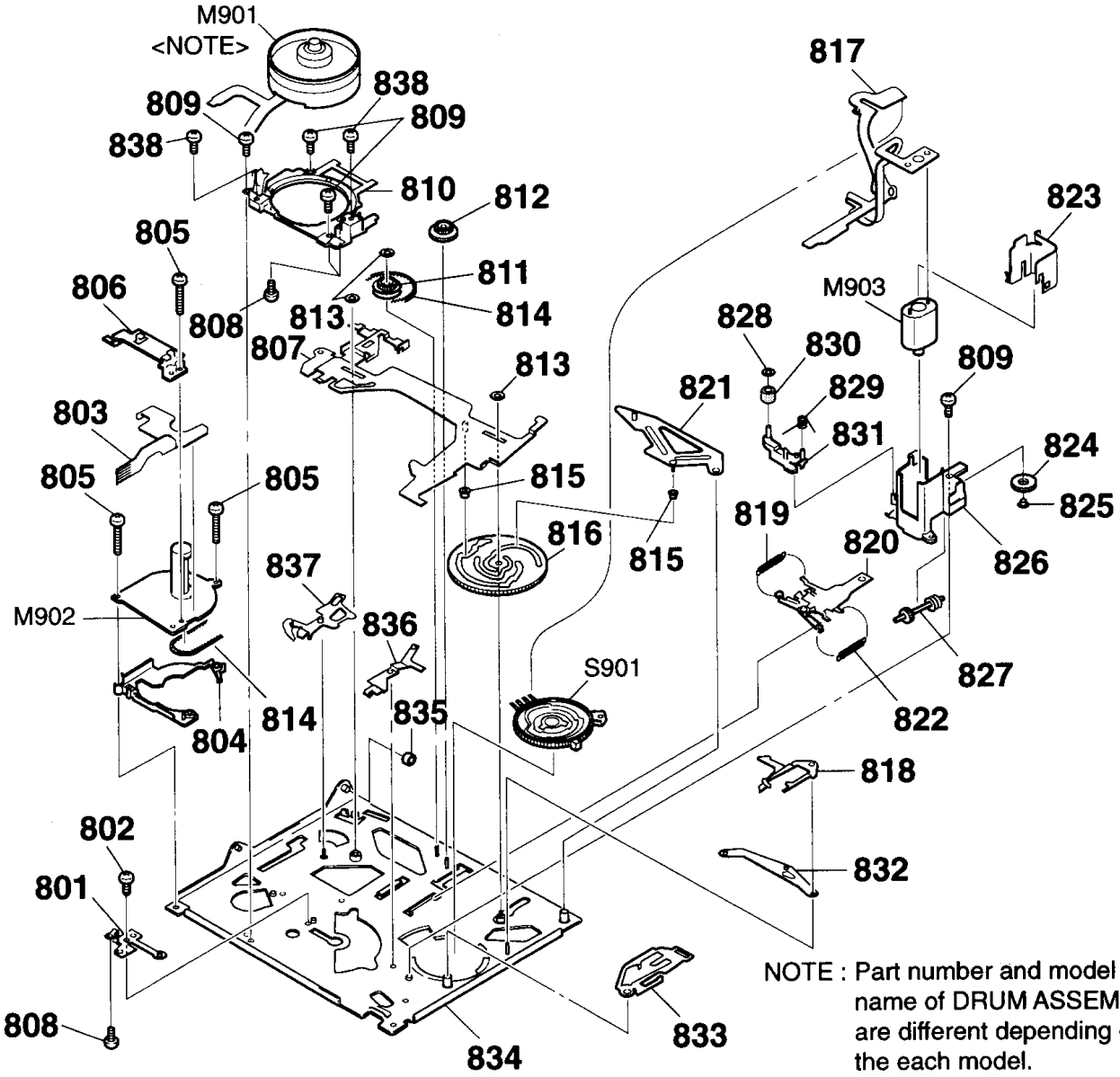
5-1. Cassette Compartment Block Section



5-2. LS Chassis Block Section



5-3. Mechanism Chassis Block Section



NOTE : Part number and model name of DRUM ASSEMBLY are different depending on the each model.